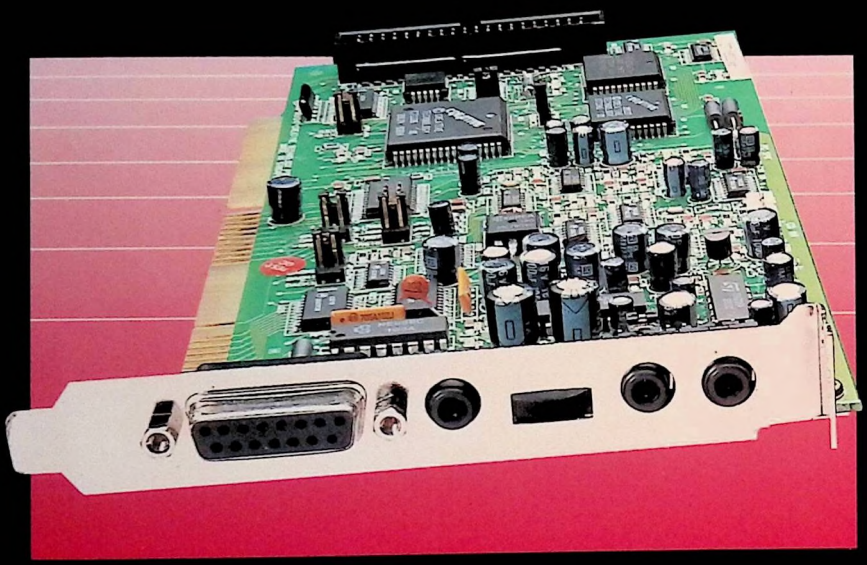
CREATIVE LABS, INC.

SOUND BLASTER PRO

SB SOUND AUDIO BLASTER

Stereo/Music/Voice/MIDI/CD-ROM Interface/Game Port

The Multimedia Sound Card For Your PC



- Full Downward Compatibility with SOUND BLASTER
- Total Software Transparency
- Full Compliance To Microsoft Windows With Multimedia Level 1 Specification

USER REFERENCE MANUAL

SOUND BLASTER PRO

USER REFERENCE MANUAL

Feb. 1992 SBP-0002
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FCC ID : IBACT-SBP2P

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MODIFICATION

Any changes or modofications not expressly approved by the grantee of this device could void the user's authority to operate the equipment.

Creative Labs, Inc.
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USA Technical Support Line: **(408) 428-6622**

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Important Readme Information

Please take time to look through the README file, if any, for the latest information concerning the Sound Blaster Pro card and/or corrections in documentation not available at printing time. To view the README file, place the Sound Blaster Pro Disk #1 in your floppy drive and from the prompt, type README and press Enter.

Introduction

Welcome to the world of Multimedia—a dream made true with the release of the Sound Blaster Pro from the Creative group of people. At Creative, we have had this dream since 1986, when we launched our talking computer—the CUBIC-CT. It was a multimedia, multi-lingual PC that had music, voice-input, voice-output, enhanced graphics and a huge ROM Disk all built into the computer. A great technological feat at that time. But the CUBIC-CT was way ahead of its time and there was little software support for its multimedia features.

When we launched the Sound Blaster Pro, we completely reversed the situation. Since Sound Blaster Pro is 100% backward compatible with Sound Blaster, it has the largest software support of any sound card. This includes quality entertainment, education, music, multimedia and productivity software; developed both in-house by Creative Labs and more than 5,000 third-party developers all over the world.

Many new and exciting multimedia applications that utilize the Sound Blaster Pro's features are on their way to flood the market. You will wonder how you ever managed to use your computer without the Sound Blaster Pro. You will find the Sound Blaster Pro just as important as your mouse and VGA graphics card.

Sound Blaster Pro is essentially two Sound Blasters in one—you have almost two of everything on the Sound Blaster Pro:

- Dual DACs for stereo or mono digitized voice output
- Stereo/Mono ADC for sampling voice in stereo or mono,
- You can now sample from the microphone, Line-in or even from the CD-Audio.
- New FM music synthesizer chips that give you enhanced sound from its four operators and eight available waveforms.
- Maximum DAC and ADC sampling rates have increased to 44.1KHz (22.05KHz in stereo).

Plus, all the audio signals are controlled and mixed by a built-in, versatile digital/analog Mixer. You can mix the following audio sources:

- Digitized stereo sound
- FM stereo music
- Microphone
- Line-in
- CD-Audio

And, can you imagine having total software control over individual volume levels? The outcome is awesome and breathtaking. We still have the joystick port and the MIDI interface with a 64-byte buffer, full duplex and time stamping features.

We are really proud that the *Multimedia PC Sound Standard* was developed based on the Sound Blaster specifications. Sound Blaster Pro, naturally, exhibits full compliance to the Multimedia PC standard. And, in anticipation of the Multimedia PC, we added a CD-ROM interface to the Sound Blaster Pro card. This interface lets you install an internal or external CD-ROM drive at a much lower cost. Check with us when you are ready to purchase your first CD-ROM drive.

We didn't stop there. To further enhance the multimedia cause, and to make sure your are set up for multimedia from day one, we decided to bundle in four more products with the already numerous software packages:

- Voice Editor II, record, play and modify sound.
- MMPLAY, a script-based multimedia presentation software.
- SBSIM, a Sound Blaster Standard Programming Tool, providing a new and easy way for applications to take advantage of the Sound Blaster Pro.
- PlayMIDI, a new program for playing MIDI files fromDOS.

These great values in the Sound Blaster Pro package allow you to be productive in Multimedia immediately. Or, you can simply enjoy the new and improved Sound Blaster favourites:

- FM Intelligent Organ (now in stereo)
- Talking Parrot (now more fun)
- Dr. Sbaitso (text-to-speech software , now crazier)

Of course, you can run the numerous and amazing games that offer great voices, music and action. Don't forget, the Sound Blaster Pro is not just for games, it is also for the Professional. There are many great education, music, multimedia and productivity software that support the Sound Blaster Pro.

The multimedia day has come, and we are really glad that you are on board. We thank you for your purchase of the Sound Blaster Pro; a product we think

Creative Labs, Inc.

Creative Technology Pte Ltd.

Chapter 1

Installation

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Installation

Before You Start

Although you are anxious to start using your new Sound Blaster Pro Card as soon as possible, take a few minutes to read these first few pages to prevent problems from arising due to software or hardware conflicts. Also, before you have installed the card and software, you may want to check the **Readme** file on the diskette **Sound Blaster Pro Disk #1** for any last minute changes or corrections not contained in this manual. Place the diskette in you disk drive and type **README** to view the file.

Important

This manual assumes a certain degree of computer knowledge and understanding of DOS. Refer to your DOS manual for instructions in making backup copies, making or changing directories and other DOS operations.

System Requirements

- IBM AT 286, 386, 486, PS/2 (models 25/30), Tandy AT and 100% compatible.
- EGA or VGA graphic card (VGA recommended).
- 2.5MB of hard disk space.

Note: MMPlay software requires a VGA adaptor to run properly, all other bundled software requires EGA graphics.

Calling Technical Support

We hope that you don't have an occasion to call, but at Creative Labs we are committed to giving our customers the best product possible as well as excellent technical support. If the need should arise, you can get technical help by calling our USA technical support at **(408) 982-9226.**

Before Calling

- Make a note of any unresolved IRQ, DMA and I/O conflicts.
- Check that external connections to the Sound Blaster Pro card are correct.

- Check that the manual volume control is set to mid-range.
- If the software you are using has a sound on/off switch, make sure it is set to on.
- If a problem persists, write down exactly what occurred. Thus should include the name and version of the software used, computer configuration, and the exact nature of the problem. Have this information ready when you call technical support. Or, if you write us, include this information in your letter or FAX.

Feel free to write us with any questions, concerns or suggestions. Numerous bulletin boards provide Sound Blaster support. Also available from Creative Labs are Sound Blaster's Developer Kits for both DOS and Windows 3.0.

Backup Copies

It is always a good and safe idea to make a backup copy of your original software. If you have not done so, make a backup copy of your Sound Blaster diskettes before beginning installation. Store your original diskettes in a safe place.

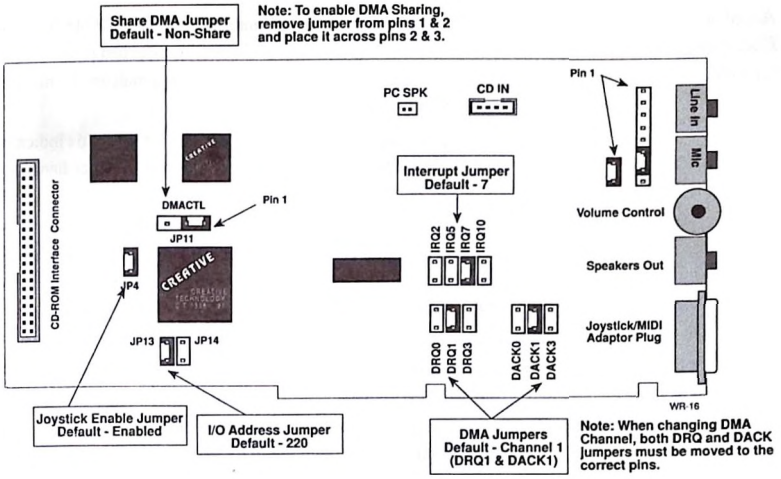
Sound Blaster Pro Card Installation

Installing the Sound Blaster Pro card in your computer is simple and easy. However, please read and follow the instructions carefully before beginning the installation process.

1. Turn **OFF** the computer and remove all power.
2. If you have a card with a joystick port already installed, either remove it, or disable the Sound Blaster's joystick port by removing by removing jumper JP4 on the Sound Blaster Pro card.
3. If your computer has a game card, either remove it or remove jumper **JP4** on the Sound Blaster Pro card to disable the joystick port (see illustration on page 1-5).
4. Open the computer and install the card into any free 16 bit slot.
5. Replace covers and restore power to the computer.
6. Adjust the manual volume control knob on the card to mid-range.
7. Connect speakers or headphones (see *Connecting Devices*).

Jumper Locations and Settings

The following illustration shows the location and default jumper settings for I/O address, DMA channel and IRQ interrupt.



Caution

The built-in stereo power amplifier has a maximum output power of four watts per channel with four-ohm speakers and two watts per channel with eight-ohm speakers. Do not play at maximum volume if your speaker cannot handle this power.

Testing Card Installation

To test Sound Blaster Pro installation:

1. Place **Sound Blaster Pro Disk # 1** in your floppy drive and from the **A:** or **B:** prompt, type **TEST-SBP**.
2. Follow the on-screen instructions.

This program tests the Sound Blaster Pro's basic hardware configuration: I/O address, interrupt and DMA channel. The program identifies the current hardware configuration then displays a menu to let you test both voice and music output.

Important *Hardware conflicts with other adaptor cards can cause the test program to halt. These other cards may be using the I/O port, interrupt or DMA channel that the test program accesses.*

Avoiding Hardware Conflicts

You can avoid hardware conflict by entering **TEST-SBP /*M***. The optional */M* switch set the test for manual selection. The test program will prompt you to select the hardware configuration that matches the number setting on the card.

If the test program reports an error on one of the settings, this indicates a hardware conflict between Sound Blaster Pro and another hardware card.

To resolve the conflict, change the hardware configuration on the other adaptor card or the Sound Blaster Pro card. We strongly suggest that you avoid changing the factory default setting of the Sound Blaster Pro because it is backward compatible with the Sound Blaster card.

If you decide to change the hardware configuration on the Sound Blaster Pro, please refer to *Changing Jumper Settings* and *Appendix C* to solve any installation problems.

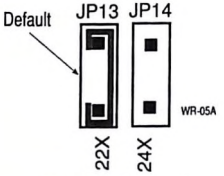
If you have changed the factory default configuration, you must install the drivers discussed in *Installing Sound Drivers*.

Changing Jumper Settings

For those who wish to change settings, switch off the computer and remove the Sound Blaster Pro card. Locate the jumpers by referring to the illustration on page 1-5.

I/O address

Only two I/O addresses are available: 220Hex and 240Hex. Place the jumper on the selected pins.



I/O Address Jumper

Interrupt Line

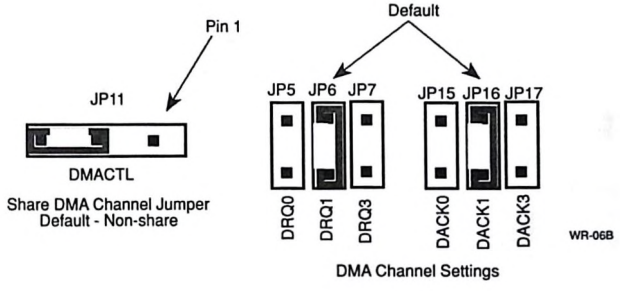
The interrupt line has three possible choices: 2, 5, 7 (default) and 10. Place the jumper on the selected interrupt.

DMA Channel

There are three DMA channels available: 0, 1 and 3. The DACK jumper must have the same settings as the DRQ jumper. The diagram shows the factory default of DMA Channel one.

The pins are used to select the DMA channel for Sound Blaster Pro. We suggest that you do not change the digitized sound default from DMA channel one.

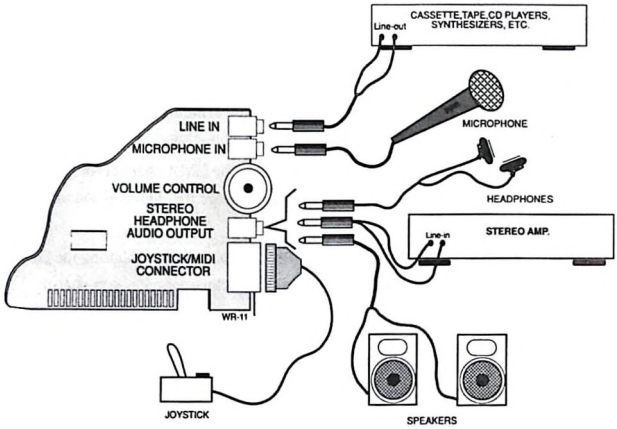
The sound Blaster Pro card is capable of sharing the DMA channel with another adaptor card. The factory default is non-sharing. To enable DMA sharing, remove the jumper from pins 1 and 2 and place it across pins 2 and 3.



Connecting Devices

Connecting speakers, microphone, joystick and line-in devices are simple (refer to illustration). However, there are a few simple rules you need to follow:

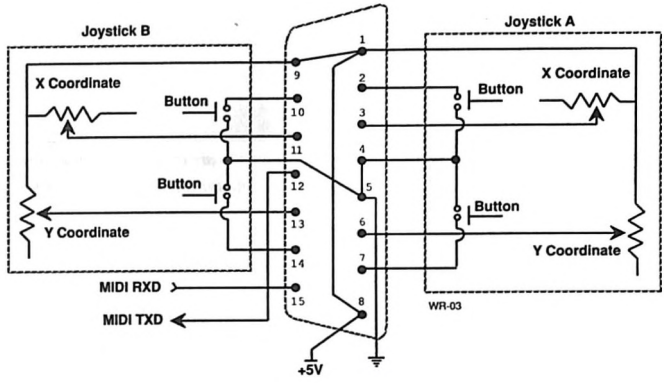
- Make sure devices are plugged into the correct jack.
- Do not set volume level to maximum if your speakers cannot handle the power output of the Sound Blaster Pro. The sound Blaster Pro generates four watts with four-ohm speaker and two watts with eight-ohm speakers.
- Use a good quality microphone. Generally, a microphone costing around US$30.00 is suitable. A condenser microphone also works well.



Joystick/MIDI Port

The joystick port on the Sound Blaster Pro is identical to that on a standard PC game control adaptor or game I/O port. You can connect any analog joystick with a 15-pin D-sub connector. It supports all standard PC joystick compatible software. Remember, if you PC already has a game card or port, either remove it or disable the game port on the Sound Blaster Pro by removing jumper **JP4**. Disabling the joystick port does not affect its use as a MIDI port.

If you need to run two joysticks, a joystick splitter Y-cable is available from Creative Labs. (Refer to the software and hardware catalog included with your Sound Blaster Pro. Using Y-cables obtained from other sources may not work.) The dual joystick port and MIDI port takes up only one slot in your PC leaving room for other cards.



MIDI Kit

To access the MIDI function requires the optional MIDI Kit., The MIDI Kit contains a MIDI adaptor with a joystick port so you can use both a joystick and a MIDI instrument.

The MIDI Kit alone does not complete the list for a MIDI setup. You still need software. The FM Intelligent Organ bundled with this package supports the MIDI keyboard. You can play the computer keyboard as well as the MIDI keyboard. Ask your dealer or call Creative Labs for the latest information on MIDI software for the Sound Blaster Pro.

Software Installation

We have bundled several software packages with your Sound Blaster Pro card to get you up and running as quickly and easily as possible. These include:

- Talking Parrot
- SB Talker
- Dr. Sbaitso
- MMPlay Presentation
- Voice Editor II
- Voice Utilities
- FM Intelligent Organ
- CD Player
- Windows 3.0 DLL and Applications
- SBSIM (Simplified Interface Module)
- PlayCMF and PlayMIDI

Important

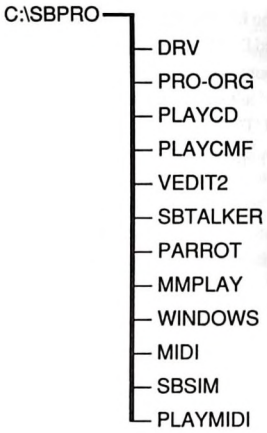
The Sound Blaster Pro's software is distribute in compressed format. You need a hard disk with a minimum of 2.5 megabytes of free space to install the software.

To install software

1. Insert **Sound Blaster Pro Disk #1** in your floppy drive.
2. Change to the floppy drive prompt (**A:** or **B:**)
3. Type **INST-HD C:** and press **Enter.**

Note: This installs the software on your C: hard disk. If you wish to install it on another hard driver, D: for example, type **INST-HD D:** and press **Enter.**

The installation program creates the **SBPRO** directory and several subdirectories automatically where files are place.



Setting Sound Environment

Sound Blaster software requires two environments strings to be set before software can run: **SOUND** and **BLASTER**. While this is done through the installation program and automatically added to you AUTOEXEC.BAT file, you need to know how they are used if you decide to make any hardware or software changes. (For additional information on the Set command, refer to your DOS manual.)

Set Sound

The install program modifies your AUTOEXEC.BAT file to include the command **SET SOUND=C:\SBPRO** (assuming your Sound Blaster software is installed in C:). If you change the sound drivers to a different directory or drive, you will have to change the Set Sound command in your AUTOEXEC.BAT file to reflect the change.

The **SOUND** environment string specifies the directory location of Sound Blaster's sound drivers and other software. Many software packages rely on this environment setting to locate the sound drivers and other Sound Blaster files.

Set Blaster

The **BLASTER** environment string specifies base I/O address, interrupt and DMA channel hardware configuration for the Sound Blaster Pro. The command for setting the **BLASTER** environment string to the factory default setting is **SET BLASTER=A220 17 D1 T4** and it changes your AUTOEXEC.BAT files to reflect the factory default settings.

Where:

A — specifies the base I/O port. It can be either 220 or 240.

I — specifies the interrupt line. It can be 2, 5, 7 or 10.

D — specifies the DMA channel. It can be 0, 1 or 3.

T — specifies Sound Blaster card type (it is 4 for your Sound Blaster Pro).

Note: There is no space before or after the = (equal) sign. But there must be at least one space between the two settings.

Installing Sound Drivers

This section is meant for those who have changed the default I/O port address and interrupt. Any time you change hardware configuration, the various drivers *must* be reinstalled to reflect these changes. This is necessary because applications developed for previous versions of the Sound Blaster cards do not support the **BLASTER** environment string. For these applications, you need to install the driver with your new hardware settings.

Changing Blaster Settings

If you have changed the Sound Blaster Pro's hardware configuration, use the **SET-ENV** program found in the **SBPRO** directory to identify the new hardware configuration on your card and modify the **BLASTER** string in your AUTOEXEC.BAT file.

CD-ROM Drive Options

The Sound Blaster Pro has a CD-ROM interface for use with Creative's CD-ROM drive only. You can check with your local dealer or distributor if you wish to purchase the optional CD-ROM drive.

CAUTION *If you purchase a CD-ROM drive other than Creative's, do NOT attempt to connect it to the Sound Blaster Pro's interface. Doing so may damage your CD-ROM drive.*

If you already own a different brand CD-ROM drive, you can connect your CD-ROM's drive's audio out to the line-ion of the Sound Blaster Pro card. An internal CD-ROM audio input is available on the card also. However, before attempting to use the internal connection, ensure you have the correct connector. (See illustration on page 1-5 for location of connector pins.)

Third Party Software

Third party software packages normally contain music and sound drivers. Just select the sound or music card from the installation menu or follow instruction found in the manual. For software that is already installed, in some cases, you may need to reinstall the software to select the correct sound card. The sound or music card is usually one of the following:

- Sound Blaster Card
- Ad Lib Music Card

Chapter 2

The Talking Parrot

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The Talking Parrot

Getting Started

This mischievous parrot likes to mimic speech. It talks back, sometimes with outrageous remarks and it even giggles when tickled. You can say anything you want, in any language. You can press any key or simply leave it alone and see what happens.

The purpose of this software is to demonstrate sound and animation. Plus, we want to give you a chance for some hands-on experience in using Sound Blaster's ability to record and play sounds then combine them with your own animated graphics.

Important

This program requires an AT (286) computer to run properly. A microphone plugged into the Sound Blaster Pro card is also required. If the microphone has a switch, make sure it is turned ON.

To start the program:

1. Change to the **SBPRO** directory.
2. Type **PARROT** and press **Enter**.
3. When the screen displays a graph indicating noise level, press **Enter** and type a number that is ten counts above the noise level displayed (140 to 230) and press **Enter** again. For example, if the graph displays 130, type **140** and press **Enter**.
4. When the parrot finishes its opening remarks, speak directly into the microphone with sufficient volume so that the parrot can hear you.
5. Press the **Escape** key to leave the program.

Customizing Your Parrot

For those who want more fun out of the Talking Parrot, you can customize it by creating your own pictures and voices. There are four PCX format pictures used to make up the parrot. You can use any paint or draw program that saves in the .PCX format to create your own version of the Talking Parrot.

Give your drawings the same file names as those listed in the table and copy them to the **\SBPRO\PARROT** directory.

Parrot .PCX Picture Files	
EGA/VGA	**Description**
PARROT.E0	Parrot with mouth closed
PARROT.E1	Parrot with mouth open
PARROT.E2	Parrot with mouth wide open
PARROT.E3	Parrot with eyes and mouth closed

Making Parrot Voices

The prerecorded voices for the Talking Parrot are stored in the PARROTV.VCB file. This file contains all 21 voices. To create your own voices, use Voice Editor II to record the 21 voices and give them the same names shown in the table. Store these files in the \SBPRO\PARROT directory.

To create the .VCB file:

1. From the **\SBPRO\PARROT** directory type **MAKEPV** and press **Enter.**

Make sure that:

- All files are recorded at 10,000Hz sampling rate
- The voice data is **NOT** packed
- Each voice data in each file does not exceed 64K
- The sum of the size of the 21 voices must **NOT** exceed the free memory after the Talking Parrot is loaded. To be on the safe side, keep the file size less than 250K.
- Before running MAKEPV, ensure you have created .VOCfiles PVOC-A to PVOC-U.

Note: The program, MAKEPV, used to create the PARROTV.VCB file, checks for the existence of the original PARROTV.VCB file and asks your permission to overwrite it.

Talking Parrot Voice Files

The following tables contain the 21 voice files that make up the PARROTV.VCB.

Random Greeting Message Files	
File Name	**Description**
PVOC-A.VOC	Hello there.
PVOC-B.VOC	Hi ! how are you ?
PVOC-C.VOC	Good day .
PVOC-D.VOC	Welcome to the show.
PVOC-E.VOC	I'm a talking parrot.
PVOC-F.VOC	Please talk to me.
PVOC-G.VOC	Nice to see you.
PVOC-H.VOC	Please say something.
PVOC-I.VOC	Have a nice day.
PVOC-J.VOC	Goodbye.
The Parrot will say files PVOC-A, PVOC-E and PVOC-D at start up. When you quit the parrot says PVOC-J and PVOC-I.	

Random Reply Message Files	
File Name	**Description**
PVOC-K.VOC	Oh ! You sound terrible .
PVOC-L.VOC	Yak ! You have bad breath.
PVOC-M.VOC	What are you saying?
PVOC-N.VOC	What are you saying? (angrily)
PVOC-O.VOC	Don't talk nonsense.
The Parrot will randomly refuse to play back the recorded voice and will send out one of these messages instead.	

Reaction Message to Keyboard Files	
File Name	**Description**
PVOC-P.VOC	Ouch!
PVOC-Q.VOC	Ooo..h
PVOC-R.VOC	Don't touch me!
PVOC-S.VOC	Go away!
PVOC-T.VOC	Hee..hee..hee
PVOC-U.VOC	Herr..herr..herr
When the keyboard is pressed, the Parrot will randomly send out one of these messages.	

Chapter 3

Text-to-Speech

Featuring Dr. Sbaitso

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Text-to-Speech Synthesizer

Getting Started

The text-to-speech synthesizer program SBTALKER is a memory-resident module that reads ASCII text and has an unlimited vocabulary. There are two application programs included with SBTALKER:

- **Read**—This program reads ASCII text files, text entered from the DOS command line, and text sent through communications ports.
- **Dr. Sbaitso**—A fun program that attempts to converse with you in English.

Important

You must load SBTALKER in memory before Read and Dr. Sbaitso can run. Remember, if you have not put the Set Sound command in your AUTOEXEC.BAT file, you need to enter, ***Set Sound=C:\SBPRO*** *or add it to your AUTOEXEC.BAT file before you can play Sound Blaster Pro software. When adding commands to your AUTOEXEC.BAT file, you must reboot before they take effect.*

To load SBTALKER:

1. Change to the **\SBPRO\SBTALKER** directory.
2. Type **SBTALK** and press **Enter**.

Note: SBTALK is a batch file (SBTALK.BAT) located in the SBPRO directory. You can run the program without the batch file by entering **SBTALKER /DBLASTER**.

To set echo effect:

1. After installing **SBTALKER**, type **SET-ECHO [*dddd*]** and press **Enter.**

Note: ***dddd*** sets the delay time for the echo effect. The range is from 0 to 4,000. Entering 1000 provides a good echo effect with a 0.1 second delay. A delay setting of 500 produces a reverb effect.

Removing SBTALKER

SBTALKER stays in memory until you remove it or reboot. You may not be able to run other applications with SBTALKER in memory.

To remove SBTALKER from memory:

1. Change to the **\SBPRO\SBTALKER** directory.
2. Type **REMOVE** and press **Enter.**

Important

To effectively remove SBTALKER, it must be the last program loaded in memory.

Using EMS Memory

SBTALKER automatically loads itself into Expanded Memory (EMS memory), if the proper EMS driver is installed in the system. SBTALKER is compatible with most EMS drivers on the market. However, if you have one that doesn't work properly with SBTALKER, it may be necessary to remove this EMS driver to run SBTALKER.

Using the Read Program

READ can read text typed at the DOS prompt and ASCII text files. Text can be entered in either upper or lower case. There are three entry formats:

- **READ "ANY TEXT"**
- **READ**
- **READ <STANDARD-INPUT** [*/W*]

Note: The */W* option displays text being read. An example entry would be: **READ <***sbtest.txt/W* .

To have this program say "Hello, how are you?" :

1. At the DOS prompt type **READ "HELLO, HOW ARE YOU?"** and press **Enter.** (or type: **READ HELLO, HOW ARE YOU?** and press **Enter.**)

To read an ASCII file:

1. Type **READ <SBTEST.TXT** and press **Enter.**
2. Press the **ESC** key to quit the program.

To read ASCII from the COM1 communications port:

1. Type **READ <COM1** and press **Enter.**

To read text enter from keyboard:

1. Type **READ** and press **Enter.**

The program will read entered text line by line until you press **CTRL-C** to quit.

Note: SBTEST.TXT is an ASCII file supplied with the software. However, you can ask it to read any ASCII text by entering the path to where the file is located.

Dr. Sbaitso Your Personal Consultant

The Dr. Sbaitso program seems to act intelligently by responding to your queries. You can ask Dr. Sbaitso any type of question or tell him your problems. Dr. Sbaitso uses a synthesized voice to reply as he tries to solve your problems.

Getting Started

To load Dr. Sbaitso:

1. Change to the **SBPRO** directory.
2. Enter **SBAITSO2 [*/S*] [*/40*]** and press **Enter.**

Note: ***/S*** and ***/40*** are optional parameters. ***/S*** sets Dr. Sbaitso to run in stereo and echo mode. ***/40*** set the screen to 40 column mode, for example: **SBAITSO2 /S/40.**

Important

Remember, before you can run Dr. Sbaitso, you need to have SBTALKER loaded in memory.

Exploring Dr. Sbaitso

When the screen displays, just follow the instructions. Dr. Sbaitso is more enjoyable if you try to find ways to make the doctor understand you using key phrases. Dr. Sbaitso will try to satisfy your questions. However, he performs best when you talk about your problems and use complete sentences.

We don't want to spoil your fun by telling you too much about Dr. Sbaitso. You can have more fun exploring Dr. Sbaitso yourself. If you want Dr. Sbaitso to repeat a response, press the **R** key.

To make the conversation more interesting, use the **.ECHO ON** command (See Dot Commands). This will cause the SBTALKER to say what you type using a different voice. Dr. Sbaitso can also perform some simple mathematics. If you feel that you are not getting much help from Dr. Sbaitso, type in the word **HELP**.

Dot Commands

Enter these commands in Dr. Sbaitso preceded by a period.

Dot Command	Description
.QUIT	This lets you quit this program. (You can also quit by typing **BYE** or **GOODBYE**.)
.READ	With this command, Dr. Sbaitso can read an ASCII text file. Format: **.READ filename.**
.TONE t	This command set the tone—**t** is either 0 (Bass) or 1 (Treble).
.VOLUME v	Sets the volume. — **V** ranges from 0 (Softest) to 9 (Loudest)
.PITCH p	Sets pitch. — **P** ranges from 0 (High) to 9 (Low).
.SPEED s	Sets the speaking speed. — **S** ranges from 0 (Slowest) to 9 (Fastest)
.PARAM tvps	Sets tone (0 or 1), volume (0 to 9), pitch (0 to 9) and speed (0 to 9).
.ECHO ON	This lets the program read what you type. **.ECHO OFF** will turn it off.
.COLOR x	Sets the background screen color. **X** ranges from 0 to 7.
.WIDTH 80 or 40	Sets screen width to 80 or 40 columns.
.HELP	Enters the help mode.

Chapter 4

Voice Utilities

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VOICE UTILITIES

Getting Started

These voice utilities are helpful in creating and changing recorded sounds, such as creating special batch files for multimedia applications. The following programs are found in the \SBPRO\VEDIT2 subdirectory:

- **VOC-HDR**—Adds headers to raw voice files
- **JOINTVOC**—Joins or combines voice files
- **VREC**—Records voice to disk from the command line
- **VPLAY**—Plays digitized voice from disk
- **VOC2WAV**—Converts .WAV voice files to .VOC files.
- **WAV2VOC**—Converts .VOC to .WAV files.
- **PLAYCMF**—Plays .CMFmusic files

We've also included two additional programs for controlling and selecting input sources and volumes levels. These are found in the SBPRO directory.

- **SB-MIX**—A memory resident program for setting Sound Blaster Pro volume levels, selecting sound sources and filters.
- **SBP-SET**—Controls the selection of sound sources, filters and volume levels from the DOS command line.

Entry Format Conventions Used

Most of the programs in this section have optional parameters . To eliminate some of the confusion , refer to the following conventions and standards used to describe files and optional parameters:

- **filename.voc**—Refers to a voice file. These can also be shown as sourcefile.voc, targetfile.voc and file1.voc. The **.VOC** extension refers to a Creative Voice File Format. All voice files are shown in bold.
- **Options**—Refers to optional settings. These are usually listed inside brackets—you do not type the brackets or colons when setting options unless specified. The lower case letters refer to variable settings for each option. The options are shown in bold italics.

Adding Voice File Header

The program, VOC-HDR adds the CT-VOICE header to a raw sound file recorded from other sources. With the header added, Voice Editor II and other programs using the CT-VOICE driver can play the sound file.

➢ Entry format:

VOC-HDR sourcefile targetfile.voc

Important *It is necessary to put the .VOC extension on the target file.*

Joining Voice Files

With the JOINTVOC utility you can combine two or more voice files into a new file.

➢ Entry format:

JOINTVOC / Ttargetfile.voc file1.voc file2.voc [*/Saa /Mbb /Rcc /RE*]

Note: The parameters **[*/Saa/Mbb/Rcc/RE*]** can be added to each voice file to be combined. Decimal values for ***aa***, ***bb*** and ***cc*** cannot be greater than 32767.

Optional Parameters

Parameter	Description
Saa	Adds a silence period to a voice file in units of 0.1 seconds.
Mbb	Adds a marker to the file. During playback of the voice, if the marker is encountered, it sends a 2-byte flag. An application program can then decide how to act when encountering these flags.
Rcc	Requests a block to be repeated. Enter -1 for ***CC*** to request non-stop repeating.
RE	Ends the repeat command.

Example

If you want to join three files, where file2.voc repeats five times and then pauses for two seconds after playing file2.voc, this is entered as:

JOINTVOC / Ttargetfile.voc file1.voc /R5 file2.voc /RE /S20 file3.voc

Recording Voice Files

Using VREC you can record a voice from the DOS command line. The voice is recorded directly to the diskette or hard disk using a double-buffering technique. The length of the recorded voice file is limited only by available hard disk space.

➢ Entry Format:

VREC filename.voc [***/B:kk***] [***/A:ii***] [***/F:hh***] [***/S:hh***] [***/M:mm***] [***/L:nn***] [***/T:ss***] [***/Q***] [***/x="command line"***]

Optional Parameters

Parameter	Description
filename	Is the filename to store the recorded voice. The default extension is .VOC. The voice is stored in the Creative Voice File format.
/B:kk	Sets the buffer size used for recording. The program uses two buffers during the recording process. ***kk*** is the size of the buffer in 2K units. If the buffer is not specified, a default value of 16 is assumed for ***kk*** (32K bytes per buffer). You can enter a range from 1 to 32 for ***kk***.
/A:ii	Selects the recording source. The default setting is **MIC**. ***ii*** must be one of the following sources: **MIC** - Microphone, **CD** - CD, **LINE** - Line in.
/F:hh	Selects the recording filter. ***hh*** can be either **LOW** or **HIGH**. The default is **LOW**. The cut-off frequency for **LOW** is 4 kHz. The cut-off frequency for **HIGH** is 8 kHz.

Continued on Next Page

Parameter	Description
/S:hh	Sets the recording sampling rate (frequency). The range for ***hh*** in MONO mode is from 4000 Hz to 44100 Hz. In the STEREO mode, the sampling rate is fixed at 22050 Hz.
/M:mm	This option selects the recording mode. Enter **MONO** or **STEREO** for ***mm***. Default is **MONO**.
/L:nn	This option controls the LINE input volume. ***nn*** can be from **0** to **15**. The default is **0**.
/T:ss	Set the recording time in one second units. The range for ***ss*** is from **1** to **65535**, giving a maximum recording time of about 18.20 hours. (**Note:** This function will not work when **/X** switch is specified.)
/Q	Specifies **Quiet** screen mode operation. When specified, except for error messages, all other messages are suppressed.
/X="command line"	Go to DOS to execute a DOS command or another program after the voice process is activated. ***command line*** specifies the DOS command or a program to be executed containing up to 16 parameters.

Playing Voice Files

Use the program, VPLAY, to play a voice file from the DOS command line. The voice file can be any size but must be a Creative Voice File Format.

➢ Entry format:

VPLAY filename.voc [*/B:kk*] [*/T:ss*] [*/Q*] [*/X="command line"*]

Parameter	Description
filename.voc	This is the voice file to play. The default extension is .VOC. The voice file must be in the Creative Voice File format.
/B:kk	Sets the buffer size used for playback. The program uses two buffers during the playback process. ***kk*** is the size of the buffer in 2K units. If the buffer is not specified, a default value of 16 is assumed for ***kk*** (32K bytes per buffer). You can enter a range from 1 to 32 for ***kk***.
/T:ss	Sets the playback time in one second units. The range for ***ss*** is from **1** to **65535**. (**Note:** This function will not work when **/X** switch is specified.)
/Q	Specifies **Quiet** screen mode operation. When specified, except for error messages, all other messages are suppressed.
/X="command line"	Go to DOS to execute a DOS command or another program after the voice process is activated. ***command line*** specifies the DOS command or a program to be executed containing up to 16 parameters.

Converting .VOC and .WAV files

These two programs provide a method of converting Creative .VOC files to Microsoft's multimedia .WAV files and from .WAV to .VOC format files.

- **VOC2WAV**—Converts Creative .VOC files to Microsoft .WAV files.
- **WAV2VOC**—Converts Microsoft .WAV files to Creative .VOC files.

Converting .VOC to .WAV files

➢ Entry format for converting **.VOC** to **.WAV** format:

VOC2WAV sourcefile targetfile [*/C:mm*] [*/R:ss*] [*/S:bb*] [*/L:rr*]

Note: When entering program command line do not type brackets or colons.

Optional Parameters

Parameter	Description
/C:mm	Sets file to mono or stereo. ***mm*** can be either **1** for mono or **2** for stereo. Default is **1**.
/R:ss	Sets sampling rate for .WAV file. ***ss*** can be **11, 22** and **44**. Default is **11**Khz.
/S:bb	Converts silence block from .VOC file to .WAV file data block. ***bb*** is either **OFF** or **ON**. ., default is **OFF**.
/L:rr	Replicates repeat rate for the count specified in the .VOC file repeat to the .WAV file. Negative repeat counts are ignored and only one .WAV data block for repeating is created. ***rr*** is either **OFF** or **ON**. Default is **OFF**.

Example Entry Formats

VOC2WAV sample.voc
Performs a default conversion: mono voice data, sampling rate 11 KHz, dosen't expand silence blocks or repeat blocks.

VOC2WAV sample.voc newsamp.wav /C2
Performs a stereo voice data conversion.

VOC2WAV sample.voc repsamp.wav /C2 /LON
Performs a conversion with repeat blocks expanded. If sample.voc has the following format:

```
Repeat 2
VOCdata
EndRepeat
```

The output file (repsamp.wav) will have the following data:

```
WAVdata
WAVdata
WAVdata
```

Converting .WAV to .VOC files

➢ Entry format:

WAV2VOC sourcefile [targetfile]

Note: DOS wildcards (*,?) may be specified for source file. Using the wildcard, the targetfile will retain the same name as the source file, but with the .VOC extension.

Example Entry Formats

WAV2VOC wavsamp.wav

Converts the file wavsamp.wav to wavsamp.voc

WAV2VOC *.wav

Converts all WAV files to VOC files with the same name.

There are a number of points to remember about .VOC to .WAV conversion due to the richness of the .VOC file format.

- Microsoft's .WAV files only supports 11, 22 and 44KHz sampling rates. All VOC files are converted based on these rates.
- Although the program takes care of the difference in sampling rates, we recommend that the original sampling rate match either 11Khz, 22KHz or 44KHz.
- Microsoft .WAV file format supports only one block of data and can be played at only one sampling rate. Therefore, the source .VOC files should only contain blocks with the same sampling rate only.
- Do not nest repeat loops in the .VOC file.
- Packed .VOC file data blocks are ignored.

Mixer Control SB-MIX

The Sound Blaster Pro mixer lets you control the volume of the following:

- **Master**—The overall volume of each source
- **Voice**—Digitized sound
- **FM Music**—Synthesized music
- **CD**—CD-ROM drive
- **Line-In**—Audio line-in

To install the program into memory:

1. Type **SBP-MIX** and press **Enter.**
2. To activate the installed SBP-MIX press and hold the **ALT** key and then the **1** key.
3. To remove the program from the memory type **SBP-MIX /*u***.

Changing the Hot-Key

➢ Entry format:

SBP-MIX [/khotkey]

The parameter ***/k*** specifies the new hot key. A hot key consists of a shift status key and a number key on the main keyboard.

The shift status key can be any of the following:

- **SHIFTL**—Left shift key
- **SHIFTR**—Right shift key
- **ALT**—Alternate key
- **CTRL**—Control key

Accessing the SBP-MIX Menu

The number key is **1** to **9** on the main keyboard. For example, to specify the **control** key and **9** as the new hot key, type **SBP-MIX /*kCTRL9***.

Once you have loaded SBP-MIX, pressing the hot key causes the menu to pop up at the DOS prompt or from any program.

Important

SBP-MIX does not work from programs that take over the keyboard interrupt. In case this happens, you need to make settings with SBP-SET before running these programs.

After activating SBP-MIX from text-mode, you can select options using either the keyboard or a mouse from the following menus:

- Card reset
- Master volume
- VOC volume
- LINE volume
- CD volume
- MIC volume
- FM volume
- FM channel
- ADC channel
- ADC input test on/off
- Stereo on/off
- Exit

To select using the mouse, place the cursor (pointer) on the desired selection and press the left mouse button. To select from the keyboard use the **Up** and **Down Arrow** keys and press **Enter**. After selecting from the main menu, an option menu displays. Highlight and select the option using the mouse or keyboard.

Graphic Mode

A full set of controls do not display when activating SBP-MIX from the graphic mode. Instead, functions are displayed at the bottom line of the screen.

You select using the **Up** and **Down Arrow** keys and set the mixer parameter using the **Left** and **Right Arrow** keys.

You can control only the main volume of the mixer in graphic mode—there are no individual left and right volume controls.

SBP-SET

Using this program you can select and mix sound from different sources, choose filters and control individual volumes. You make selections and setting from the DOS command line.

To run SBP-SET:

1. Type **SBP-SET** [*/options*] and press **Enter**. (Refer to the following list of optional parameters.)

SBP-SET Option Table

Option	Description
/Q	Specifies the quiet screen mode. When selected, all other messages are suppressed except for error messages.
/R	Returns all settings to original defaults.
/X:nn	Sets microphone volume. **nn** is a range from 0 to 7. The default is **0**.
/ADCF:xx	Selects the recording filter cut-off frequency. **xx** is **LOW** or **HIGH**. The default is **LOW**.
/ADCS:xx	Selects recording source. The default is **MIC**. **xx** can be either **MIC**—Microphone, **CD**—CD or **LINE**—Line-in
/ANFI:ON/OFF	Selects the recording filter. **ON** records using the filter. **OFF** records without the filter. Default is **ON**.
/DNFI:ON/OFF	Selects output filter option. **ON** sends voice output through the filter. **OFF** bypasses the filter. Default is **ON**.
/VOLUME:l,r	Sets the left and right volume levels for **M**—Master volume, **FM**—FM volume, **VOC**—Voice volume and **LINE**—Line-in volume.
	Volume levels range from 0 to 15 for **l** (left) and **r** (right) volume. The default volume for Master, FM and Voice is **9**, for Line-in it is **0**.
	Example: Setting left volume to 7 and right volume to 9 for Line-in is entered as: **/LINE:7,9**
	You can set volume at any time using the above parameters, or you can place a command in your AUTOEXEC.BAT file to set a volume level suitable to your sound system.
	Example: Putting the following line in your AUTOEXEC.BAT file to sets the Master volume to level 12, Digitized Voice to level 14, FM music volume to level 12 and Line-in volume to level 12 : **SBP-SET /M:12,12 /VOC:14,14 /FM:12,12 /LINE:12,12**
/CD:nn	Sets CD volume. **nn** ranges from 0 to 15. The default level is **0**. There are no left and right volume controls for the CD.

Chapter 5

Voice Editor II

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VOICE EDITOR II

Designed to take full advantage of the Sound Blaster Pro card, Voice Editor II lets you record, play, enhance, change and arrange sounds to suit your needs. You can select from different sound sources, such as microphone, Line-in and CD player. You can also add markers and ASCII text to your sound samples for use in other multimedia and interactive software applications.

Getting Starting

1. Change to the **C:\SBPRO** directory and type **VEDIT2** [***/B:nn***] and press **Enter.**

Note: */B:nn* in the brackets (do not type brackets) is optional and lets you set the buffer size for playing from disk by entering a number for ***nn*** in 2k units. If ***nn*** is not specified, it uses 16 as the default (32k bytes). Playing a voice from the diskette uses a double-buffering method. You get a smoother sound if the buffer size is bigger.

2. When the Main Screen with Copyright Screen displays, press any key or click the mouse button to remove the Copyright Screen.

Important *Both the keyboard and a Microsoft compatible mouse can access the Voice Editor II's menus. Voice Editor II utilizes only the left button.*

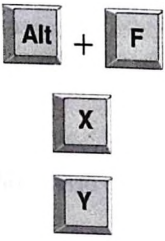
Getting Around

Voice Editor II is not complicated. It is a matter of understanding how to use the keyboard or mouse, using the menu and selecting options. Most options require little or no explanation. As you go through Voice Editor II's menu system, we have provided detailed explanations where necessary. However, you can go ahead and begin exploring Voice Editor II now and come back if you have a problem or question.

Keyboard Fundamentals

To access the menu from the keyboard:

1. Press the **Alt** key and the key of the underlined character in the Main Menu and the underline character in the Options Menus. You can use the **Up, Down, Right** and **Left Arrow** keys to highlight the menu or option and press **Enter**.

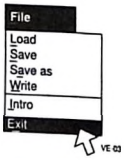


VE-01

For example, to quit Voice Editor from the keyboard:

1. Press and hold the **Alt** then press the **F** key. This opens the File Menu.
2. Press the **X** key or use the **Up** and **Down Arrow** keys to highlight **Exit** and press **Enter**.
3. Select either **Y (Yes)** to exit to DOS or **N (No)** to cancel the request.

Using the Mouse



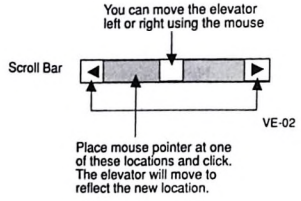
VE-03

To access the menu and options, simply move the cursor (pointer) to menu item and press the mouse button and hold. When the menu pops down, move the mouse to highlight and select the desired option and release the mouse button.

When selecting more than one item or a group, place the cursor at the beginning of the item. You then press and hold the mouse button while you drag the mouse to the end of the item and release the button.

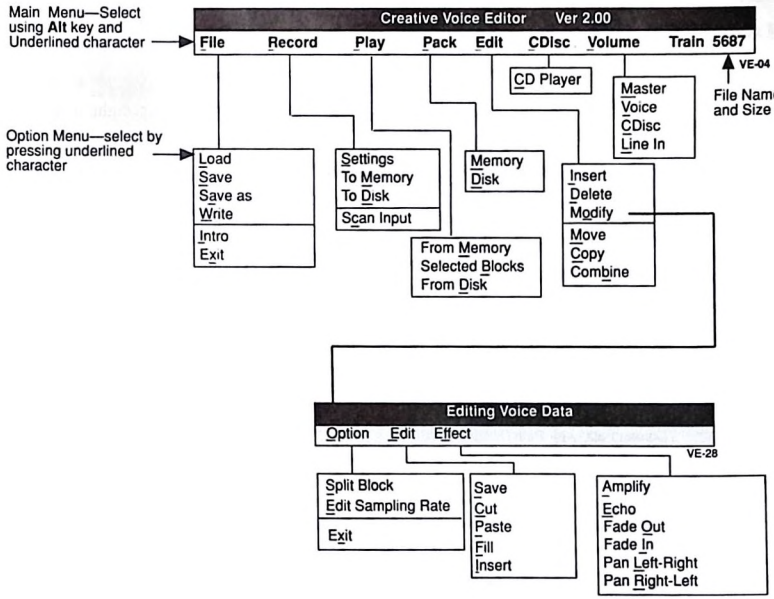
There are Scroll bars on many of the screens. You can click on the arrows, in the shaded area of the scroll bar or click, hold and drag the box (elevator) within the shaded area.

To quickly select and load a file, move the pointer to the file and double click. You can also double click to change directories and drives.


You can move the elevator left or right using the mouse
Scroll Bar
VE-02
Place mouse pointer at one of these locations and click. The elevator will move to reflect the new location.

Getting from Here to There

It is from the main menu screen that you select options. The main menu runs across the top of the screen and has an associated pop down menu listing ooptions.



File Options

Load
Save
Save as
Write
Intro
Exit

The File menu loads, saves, saves selected blocks (Write) and exits Voice Editor II. Intro displays the Copyright Screen.

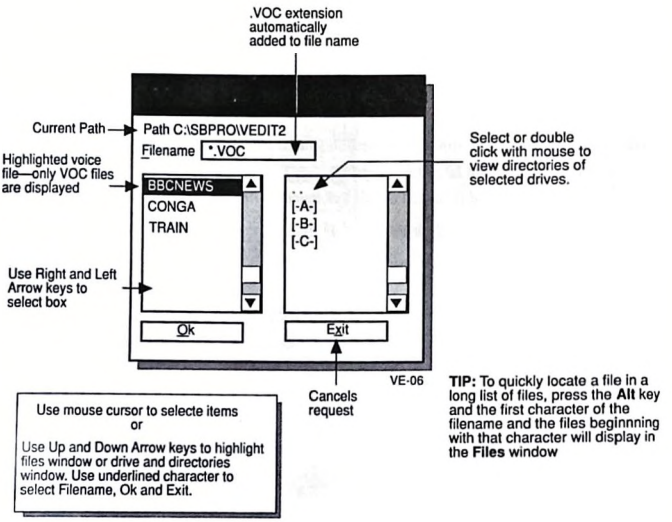
You can not select the grayed out options: Save, Save as and Write under the File menu at this time.

Load

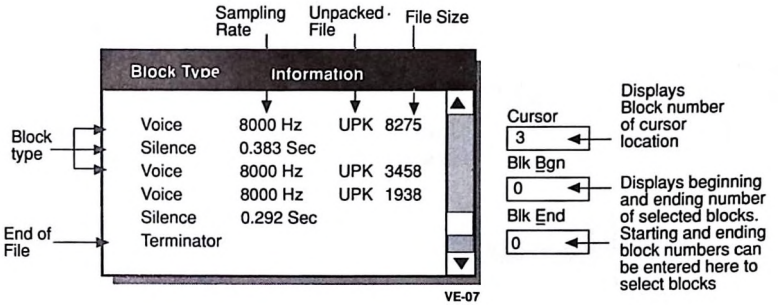
To load a file:

1. Select **Load** from the options menu.
2. When the File Directory Screen displays, highlight a voice file in the files box.

Note: This screen displays any time you Load files, Save, Save as, Write files, blocks or data to disk. It also displays when you Play from disk.


.VOC extension automatically added to file name
Current Path
Path C:\SBPRO\VEDIT2
Filename *.VOC
Highlighted voice file—only VOC files are displayed
BBCNEWS
CONGA
TRAIN
..
[-A-]
[-B-]
[-C-]
Select or double click with mouse to view directories of selected drives.
Use Right and Left Arrow keys to select box
Ok
Exit
VE-06
Cancels request
Use mouse cursor to selecte items or
Use Up and Down Arrow keys to highlight files window or drive and directories window. Use underlined character to select Filename, Ok and Exit.
TIP: To quickly locate a file in a long list of files, press the Alt key and the first character of the filename and the files beginnning with that character will display in the Files window

Once a file is loaded into memory, the Block Information Screen displays. This screen displays the information contained in a Voice file. As you edit or change voice files, the changes are reflected in this screen. A voice file consists of Voice, Silence, Repeat, ASCII text, Marker and Terminator blocks. Marker and ASCII text blocks are explained later.



Understanding Blocks

A basic understanding of blocks and how they relate to Voice Editor II can prove benifical to the user. Blocks make up a voice file. Each voice file can contain:

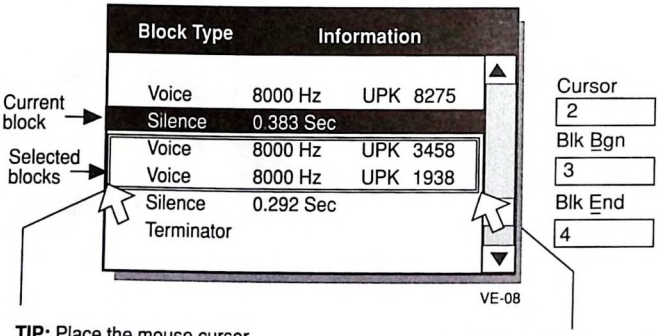
- **Header**—Used to define a .VOC file for Sound Blaster card.
- **Voice**—This is normally the sound you hear. Can be mono or stereo. (Only unpacked data blocks can display as a waveform.)
- **Silence**—You can add, change or remove silence from a data block.
- **ASCII text**—An ASCII text strings provide titles or other information.
- **Marker**—A marker sends out a two-byte flag so other application can perform a certain task when it sees this marker.
- **Repeat**—Provides a method for a block to repeat.
- **End Repeat**—Indicates end of repeat blocks.
- **Terminator**—Indicates end of file.

Selecting Blocks

Before you can edit or play a Voice block, it is necessary to learn how to select blocks. You can select blocks from the keyboard or with a mouse. You can select more than one block at a time. However, selected blocks must be next to each other. You cannot select terminator blocks.

Each line is numbered in ascending order. The screen below shows blocks three and four selected. The double rule box indicates selected blocks. The reverse (highlighted) text, line two, is the current block. You can define or select both current block and selected blocks at the same time. The windows on the right side show the location of selected blocks and the cursor.

Selecting blocks may be a bit confusing at first, but it gets easier with practice.



TIP: Place the mouse cursor at this point, press and hold the mouse button and move the pointer to the left off the screen to select all blocks from that point to the top.

TIP: Place the mouse cursor at this point, press and hold the mouse button and move the pointer to the right off the screen to select all blocks from that point to the bottom.

Using the Keyboard and Mouse

VE-09

To select blocks using the keyboard:

1. Press the **B** key then type the number of the beginning block and press **Enter**.
2. Press the **E** key then type the number of the ending block and press **Enter**.
3. To select current block, use the **Up** and **Down Arrow** keys.

To select blocks using the mouse:

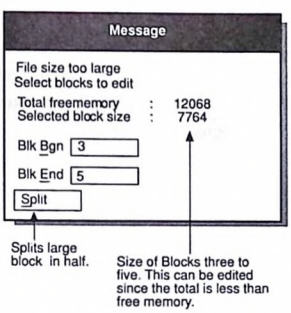
1. Place the cursor on a block, click and hold, then drag the pointer over the blocks you want to select and release the mouse button.
2. To select a current block, place cursor on the block, click and release the mouse button.

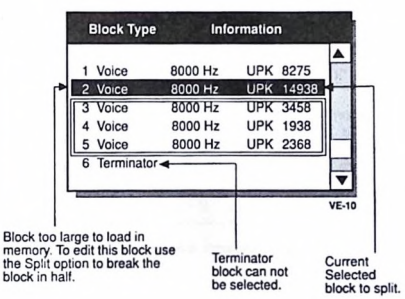
Loading Large Files

Since recorded files can be as large as available hard disk storage space, files can be too large to load in to memory. To get around this limitation, Voice Editor II provides a method that lets you edit a portion of the file.

Loading a file too big for available memory causes two screens to display:

- **Block Type Screen**—Show each block numbered
- **Message Screen**—lets you select blocks and split files

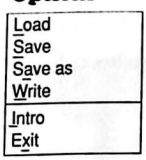

Message
File size too large
Select blocks to edit
Total freememory : 12068
Selected block size : 7764
Blk Bgn 3
Blk End 5
Split
Splits large block in half.
Size of Blocks three to five. This can be edited since the total is less than free memory.


Block Type
Information
1 Voice 8000 Hz UPK 8275
2 Voice 8000 Hz UPK 14938
3 Voice 8000 Hz UPK 3458
4 Voice 8000 Hz UPK 1938
5 Voice 8000 Hz UPK 2368
6 Terminator
Block too large to load in memory. To edit this block use the Split option to break the block in half.
Terminator block can not be selected.
Current Selected block to split.
VE-10

You select blocks the same way you did in the Block Information Screen. You can split files too large for memory using the Split option in the Message box. After selecting blocks, press the **O** key or select **OK** with the mouse. The normal Block Information Screen then displays.

The portion edited is appended or reconnected to the original file when saved.

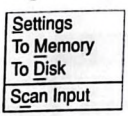
More File Options



Now that you know how to load a file, what blocks are and how to select them, the rest of the file options are easy.

- **Save**—this does exactly what it says. It does not give you a change to change your mind and overwrites the original file saving any changes to disk.
- **Save as**—Gives you the opportunity to rename a file without overwriting the original file. Selecting this option causes the Directory/Drive screen to display.
- **Write**—Lest you save selected blocks from the Block Information screen to a file (See illustration below).
- **Intro**—displays the Copyright screen.
- **Exit**—This the option you select to quit Voice Editor II.

Record Options



Now that you know how to load a file and select blocks, we can proceed to the good part.

Recording sound with Voice Editor II is similar to using a tape recorder—first you connect all cables and devices correctly, select the sound source, check input level and then press the record button.

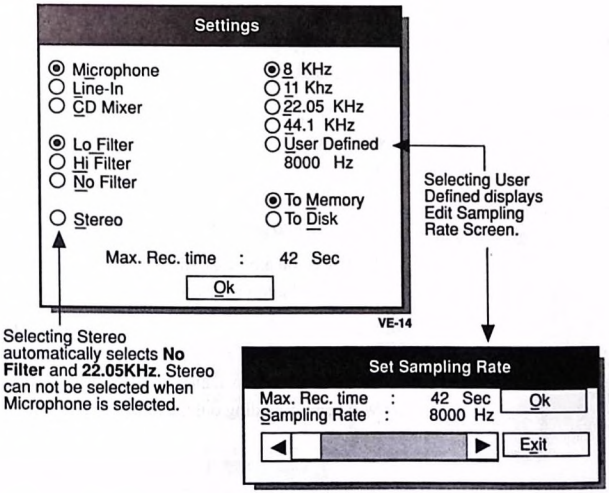
Actually, there are a few other things we have to do in Voice Editor II before we can record. The first thing is to select the Settings option in the Record menu. This displays a screen for selecting sound source, filter, sampling rate, and record mode (stereo/no stereo).

Settings

To set recording options:

1. Select **Settings** from the **Record** option menu.
2. Select sound source, filter, sampling rate and where you want to store the recording.
3. After making selections, select **Ok**.

The Settings Screen lets you choose between three sources and four sound types. You cannot select Microphone and Stereo at the same time. Line In and CD Mixer in the mono mode can select either low or high frequency filter. In the stereo mode, unfiltered and 22.05KHz are automatically selected.



Filter selection is dependent on the sampling rate you select when recording. Use the following chart to determine filter selection.

Sampling Rate	Select Filter
less than 18KHz	Low - 3.2KHz filter
18KHz to 36KHz	High - 8.8KHz filter
36KHz and above	No filter

When setting the Sampling Rate, you will notice that the higher the sampling rate, the shorter the recording time. Also, remember to set the sampling rate to match your filter selection (Refer to the filter chart). For a better understanding of Sound Sampling refer to the *Sound Basics* section. Generally speaking, the higher the sampling rate, the better the recorded sound quality.

Scanning Input

The next thing you need to do is make sure there is sound input to the Sound Blaster Pro card. If you have selected CD or Line-In, you can hear the sound. You cannot hear output from the microphone through the speakers. However, you can see a graphic representation of the selected sound source.

To scan input:

1. Select **Scan Input** from the option menu. A screen displays an active waveform. If you are using a microphone, you need to speak into it before you can see the waveform.
2. Once you are satisfied with the input, press **Escape** or press the mouse button to remove the Input Scan Screen.

Note: The Sound Blaster Pro board has a built-in self-attenuation system to prevent spiking. When you speak or play sound, you may notice a line touch the bottom of the waveform screen. However, the Sound Blaster Pro card will begin rounding out the signal to prevent this.

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Recording to Memory

Now you are ready to record. If you selected **To Memory** in the Settings screen, remember you only have a certain amount of available memory. Voice Editor II does not yet support extended memory. Naturally, if you select the hard disk, you will have a longer recording time since you can fill an entire hard disk with a sound file.

To record to Memory:

1. Make selectons in Setting Screen and select **To Memory** and select **Ok**.
2. Select **To Memory** in under the **Record** menu and select **Ok**.

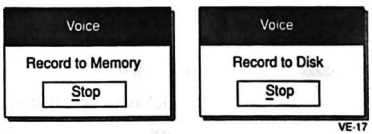
Once you make the selection, Voice Editor II begins recording. A screen will be displayed while recording. This screen also lets you stop the recording. When recording is completed, the Block Information Screen displays the new block information.

Recording to Disk

To recording to disk

1. After making the initial settings, select **To Disk** and select **Ok**.
2. Select **To Disk** in the option menu under **Record**
3. When the Directory/Drive Screen displays, enter **Filename** and select **Ok**.

Note: If you select an existing file name in the Directory /Drive Screen, Voice Editor II will ask if you want to overwrite the file.



Play Options

From Memory
Selected Blocks
From Disk

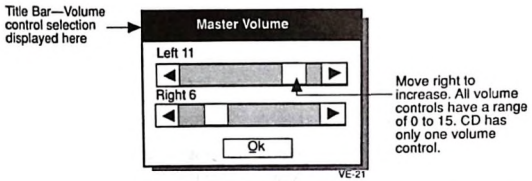
Now that you have learned how to load a file, select blocks and record files, naturally you want to play them. Unless a file is loaded in memory, the only option available is playing from disk. Before playing a file, however, you might want to check and set the volume level.

Setting Volume

Master
Voice
CDisc
Line In

To set volume:

1. Select **Volume** from the Main menu.
2. When the option menu pops down, select one of the following:
   - **Master**—You need to set the master volume control to an audible level before individual volume controls can take effect.
   - **Voice**—Controls voice output.
   - **CDisc**—Controls CD Player. You cannot control left and right volume separately.
   - **Line In**—Controls devices connected to the Line-in jack.


Title Bar—Volume control selection displayed here
Master Volume
Left 11
Right 6
Ok
Move right to increase. All volume controls have a range of 0 to 15. CD has only one volume control.
VE-21

Important *Set the manual volume control located on the back of the Sound Blaster Pro card to at least mid range for software volume controls to take effect. The software volume controls have a range of 0 to 15.*

Playing from Disk

To play from disk:

1. Select **From Disk** in the option menu
2. When the Directory/Drive Screen displays, select a file.
3. Select **Ok**.
4. To stop playing, select **Stop** on the current screen.

Note: Playing a file from disk does not affect a file loaded in memory.

Playing from Memory

To play a file from memory:

1. Load a file from disk into memory. (You can also play a recorded file that is still in memory.)
2. Select **From Memory** in the option menu.
3. To stop playing, select **Stop** from the current screen.

Playing Selected Blocks

To play selected blocks:

1. Select any combination of blocks in the Block Information Screen.
2. Select **Selected Blocks** in the option menu

The only blocks you can play and hear are Voice blocks. You can select individual Silence, ASCII and Marker blocks and try to play them, but don't expect to hear anything.

You can play a group of Voice blocks or even select a combination of Voice, Silence, ASCII and Marker blocks, but you will only hear the Voice block mixed with silent periods.

CD Player

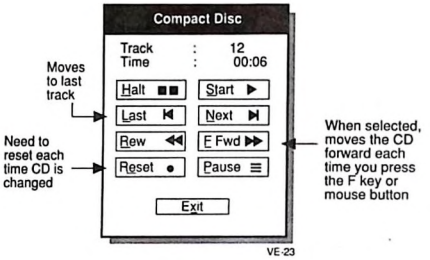
CD Player

If ;you have a CD-ROM drive installed, you can select CD Mixer as a sound source in the Record Setting menu. Selecting the CDisc option lets you control your CD-ROM drive from this menu.

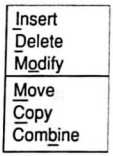
To control the CD-ROM drive:

1. Select **CDisc** from the Main menu.
2. Select **CD Player** in the option menu to display CD Player Control Screen.

Note: The CD Player can play in the background. For additional information regarding the CD Player connection, the CD Section of this manual.



Edit Options

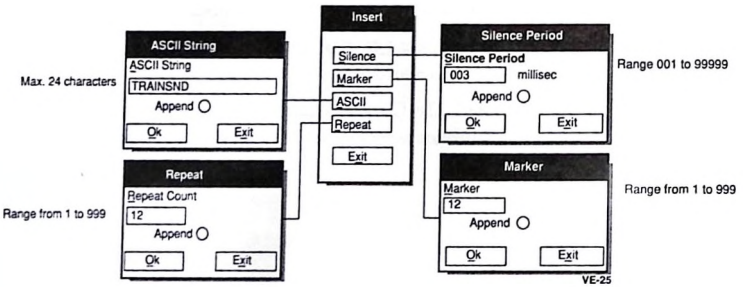


Now that you can load a files, select blocks, play and record files, we are to the point where we modify voice files. But, before we can edit anything, a file must be in memory, either a recorded file or a file loaded from disk.

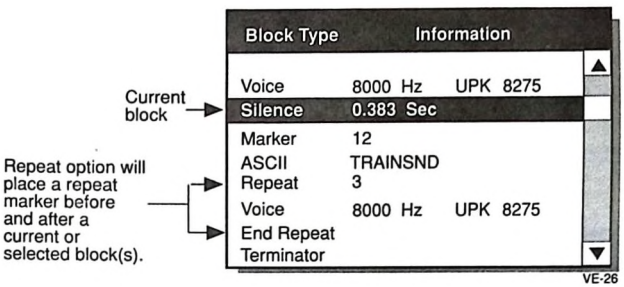
If you do not have any blocks selected, the options Move, Copy and Combine are grayed out and cannot be selected. We will cover them later, but first we will cover Insert, Delete and Modify. These options affect the Current block (Current Block, is the block reversed or highlighted in the Block Information Screen.)

Insert

Using Insert, you can add additional blocks of information to your existing voice file. Selecting any one of these options displays an entry screen with an append option. Selecting append places the block beneath the Current Block. Enter the data you desire and select **Ok** or **Exit** to return to the previous screen.



Selecting the Insert options creates new blocks and places them in the Block Information Screen.



Delete

If there are no blocks selected, this option asks if you want to delete the Current Block. If you have selected blocks, it asks if you want to delete Selected Blocks.

Modify

Selecting Modify either displays a waveform screen along with another set of menus, or a data entry input screen. A file must be loaded in memory before you can select Modify. You can modify any block shown in the Block Information Screen, except the Terminator block.

Important

Only unpacked voice blocks can be displayed as a waveform. A packed voice file only allows you to modify the sampling rate. When modifying stereo voice files, two waveforms are displayed, however, you cannot modify right and left stereo channels individually.

You can modify Silence, ASCII, Marker or Repeat blocks. If you choose to modify one of these blocks, an entry screen is displayed giving you the opportunity to change the data in those blocks. When modifying the Silence block, you can change the silence period and sampling rate. If there are no Selected blocks, an entry screen displays for the Current block.

Note: Remember, the double-ruled box defines the Select block(s). The reversed or highlighted block is the Current block.

To display and modify Voice block waveform:

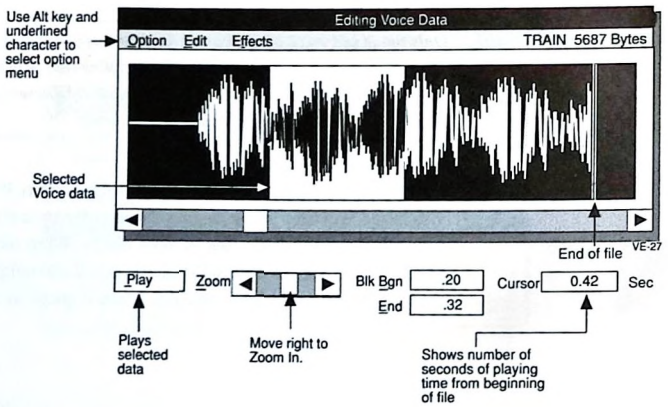
1. Select a Voice block in the Block Information Screen.
2. Select **Modify** from the **Edit** menu.
3. Select all or portions of the waveform to modify.
4. Choose one of the options from the **Modify** menu.

Selecting Waveform Data

Using the waveform screen display, you can cut, paste, save and rearrange the waveform to create special effects. However, before you can use most of the Modify Menu options, you need to know how to select a portion of the waveform or voice data using the mouse or the keyboard.

Using the mouse, you simply move the cursor to a beginning point, click and hold the mouse button while dragging the mouse left or right. Once you reach the desired ending point, release the button. You can also use the scroll bar below the waveform.

From the keyboard, move the cursor using the **Tab** or **Shift** and **Tab** key, or the < and > keys to a beginning point. Now press and hold the **Ctrl** key then press the **B** key to select the beginning point.

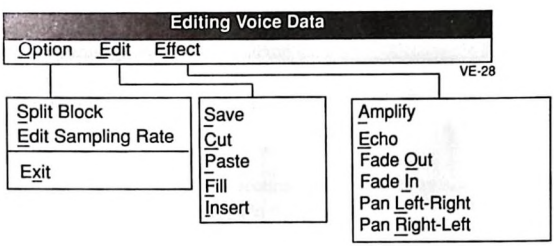


To select the ending point, move the cursor to an ending point and press and hold the **Ctrl** key and then press the **E** key.

Another method is to enter the location values into the **Blk Bgn** and End windows. Press **B** and type in a value and then press **Enter**. Press **E** and type in a value ant then press **Enter**.

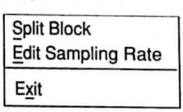
The Modify Menus

When you select the Modify option, it displays a second menu used to modify voice files. These include: Option, Edit and Effects.



Option Options

The **Option** menu is used to split waveforms, change sampling rates and for returning to the Main menu.



Split Block

With this option, you can split a Data block at any location on the Waveform Screen.

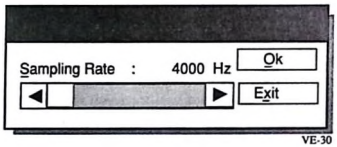
To split a Data block:

1. Click at any point in the waveform with the mouse.
2. Select **Option** from the menu and then select **Split Block**.

Note: From the keyboard, use the **Tab** key to move the cursor to the right in big jumps. Press and hold the **Shift** key and press the **Tab** key to move the cursor to left in big jumps. Use the < and > keys to move the cursor left or right in small increments. Once you have moved the cursor to the desired position, press the **Alt** and **O** to select **Option** and then press the **S** key.

Select **Exit** to return to the Main menu. You will notice that another Voice block has been added to the Block Information Screen. If you decide that you do not want to do this, you can either reload the original file or select the two Voice blocks that have split and use the **Combine** command in the **Edit** menu from the Main screen to recombine them. We'll cover Combine a little later in this manual.

You can change the sampling rate of Voice blocks using this option. Using this option changes the tone or pitch. You cannot change the sampling rate of selected portions of waveform. Any change affects the whole Voice Block.



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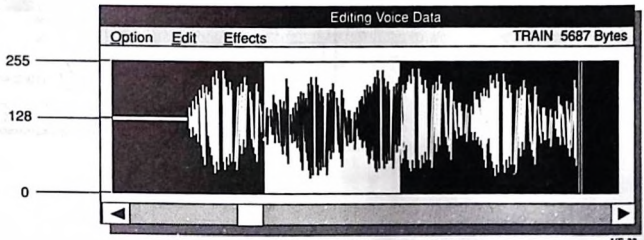
Waveform Edit Options

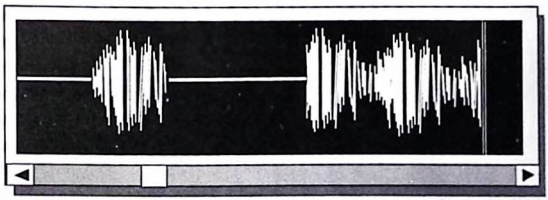
Save
Cut
Paste
Fill
Insert

The Edit options are similar to some of the options in the Main menu, except here they apply to data selected in the waveform display.

- **Save** — This option lets you save the selected portion of a waveform. When selecting this option, you can save it with a new file name or overwrite the existing file.
- **Cut** — with this option you can cut a portion of the waveform. The cut portion of the waveform is held in memory until you decide to paste it at some point in the waveform.
- **Paste**—This option lets you paste cut voice data any place within the waveform. You can only paste once. There is no copy option. You can, however, copy selected blocks in the Block Information Screen.
- **Fill** — Selecting this option displays an entry screen where you can enter a value from 0 to 255. The default is 128 which is the silence point. If you use the defalut, it places a straight line in selected portion of the waveform.
- **Insert**—This option is almost the same, except it places the value at the cursor location in the waveform.

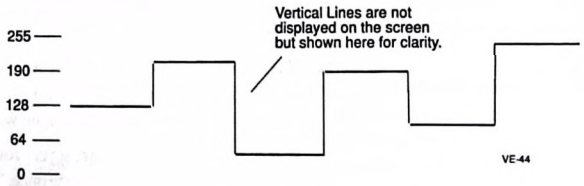


Waveform with data selected



Waveform after selecting fill with the default value 128

Using Fill and Insert you can create your own square waveforms similar the following illustration.

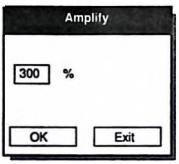


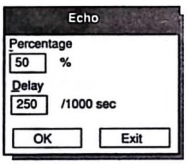
Effects Options

Use these special effects to create new and unique sounds.

Amplify
Echo
Fade Out
Fade In
Pan Left-Right
Pan Right-Left

- **Amplify** — Selecting Amplify displays an entry screen with the default set at 200%. Enter a value to increase the volume of your sound. You can amplify a portion of the waveform or the entire Voice block.





- **Echo** — Selecting Echo displays an entry screen where you can set the percentage of echo and a delay time. The best way to learn this is by playing with different percentages and time delays. One way to produce a good echo is to add some silence data to the end of the sound before applying the Echo effect. This provides time for the sound to fade gradually. Use the **Insert** option under **Edit** on the Main Menu.

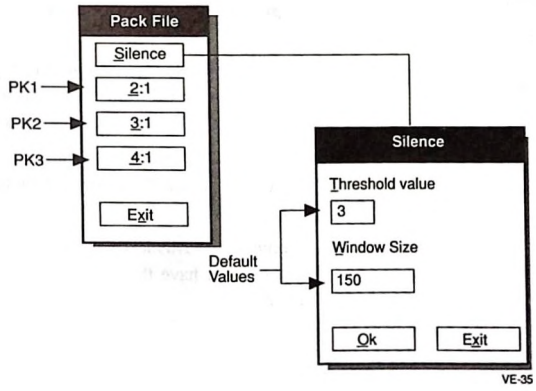
- **Fade Out**—This option takes the selected portion of the waveform and gradually reduces the sound volume until it fades out.
- **Fade In** — The reverse of Fade Out, this option gradually increases the volume of the selected portion of the waveform to its highest setting.
- **Pan Left-Right** — Use this option to create the effect of sound moving from left to right. It takes a selected portion of the waveform and moves it gradually from the left speaker to the right speaker.
- **Pan Right-Left**—This does the same as the Pan Left-Right option, except it moves sound from right to left speaker.

Note: The Panning effect works only with stereo voice files., not mono.

Packing Files

Memory
Disk

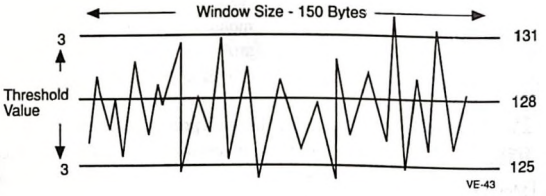
Voice Editor II provides four methods for compressing voice files. Three of these are compression techniques that compress files in ratios of 4:1, 3:1 and 2:1. The 4:1 ratio reduces the size of the file by 75%, 3:1 by 66% and 2:1 by 50%. You can pack files in memory or disk. The Block Information Screen reflects whether a Data block is packed or unpacked by placing PK1, PK2 or PK3 in the block.



Important

While packing files can save space, you can not unpack files. Also, you can not modify the waveform of a packed file. If you want to pack a disk file, but don't want to overwrite the original file, you need to save it using a different file name.

Silence is the fourth method of reducing file size. When you select the silence option, an entry screen displays with a threshold default of 3 and a window size default of 150. The Voice Editor searches for voice data that falls withing the threshold value and is larger than 150 bytes (see illustration). This data converted to Silence blocks reducing the file size.



Back to Block Editing

Insert
Delete
Modify
Move
Copy
Combine

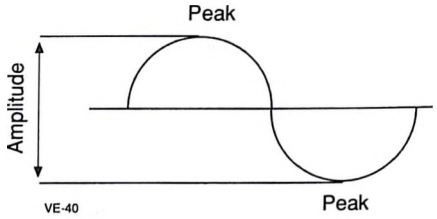
Now that we have learned to modify waveforms and other blocks of information, we need to return to the last three options under Edit on the Main Menu Screen: Copy, Move and Combine. These options do exactly what they say and effect the selected blocks in the Block Information screen.

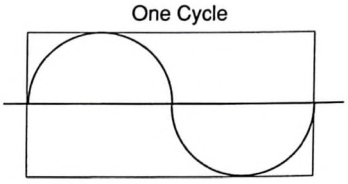
- **Copy** — With this option you can copy the Selected block(s) and move them to a different location. Once copied, the block(s) appear above the Current block location.
- **Move** — This option lets you move one or more blocks to a different location. The Current block location determines the new location.
- **Combine** — This lets you combine Voice blocks only. Voice blocks must have the same sampling rate before they can be combined.

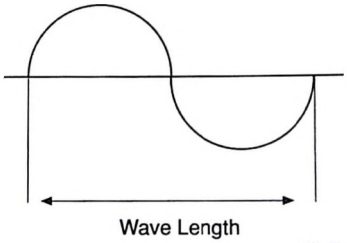
Sound Basics

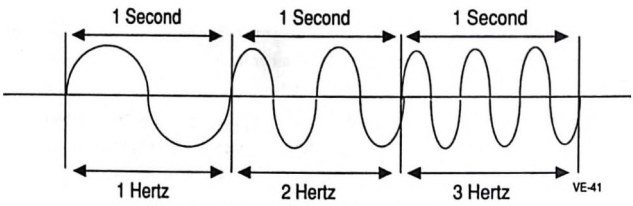
Sound is nothing more than the movement or vibration of molecules in the air that cause other things to vibrate—like your auditory nerves that let you hear sound.

Sound is, for our purpose, represented by sine waves. Sine waves have two characteristics—frequency and amplitude. Frequency is the number of cycles per second and has an effect on the pitch or timbre of a sound. Amplitude, represented by the height of a sine wave, is also the loudness of a sound.









Frequency equals number of cycles per second

Sampling Rate

Sound waves are not simple sine waves, but complex waves. When you record a sound with the Sound Blaster Pro, it changes analog signals into digital signals.

Sampling is the number of times the Sound Blaster Pro looks at a sound to creates a digitized version or image of the sound. For example, recording sound at 4KHz, create 4000 digitized images or samples in one second. When looking at a standard sound waveform, compared to a digitized image you can see bits of information make up the digitized image. In the case of Voice Editor II, you can select between 4Khz (4,000 Hertz) and 44.1KHz when recording. This sampling rate affects the quality of sound—the higher the sampling rate, the better the sound. A CD has a sampling rate of 44Khz at 16 bits.

Since sampling rate is measured in frequency (Hertz), changing the

Original Sound Waveform

Digitized Waveform

Chapter 6

Multimedia & MMPlay

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Sound Blaster Pro Extensions to MMPlay 6-6
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MULTIMEDIA & MMPlay

Getting Started with MMPlay

MMPlay provides an impressive method of creating eye-catching graphics combined with superb sound. This is accomplished by integrating graphic animation from Autodesk's Animator and the sound capabilities of the Sound Blaster Pro card. You can easily combine the power of Sound Blaster Pro with Autodesk Animator to create unique synchronized animation and sound audio/video presentations on your PC.

We have included a multimedia demo using Animator designed graphics and the Sound Blaster Pro.

To start demo:

1. Change to the **SBPRO\MMPLAY** subdirectory.
2. Type **MMDEMO** and press **Enter**

Note: Demonstrations require a lot of disk space. If you need to see more impressive demonstrations, check with your dealers or distributors for other MMPLAY Demos.

To start MMPlay:

1. Type **MMPLAY** *<script>* and press **Enter**.
2. To abort the presentation, press the **Ctrl** and **End** keys at the same time (**Num Lock** must be off).

Note: *<script>* is the name of the script file used to control the presentation. Scripts are ASCII files created with a text editor. The presentation stops only at the end of a play sequence.

Script Commands

When creating a script file, you enter a command on each line. You can use any text editor to create the ASCII scripts, such as EDLIN included with DOS.

The following conventions are used to describe script commands:

- Commands are not case sensitive. However, commands must be entered with the period.
- The Parameter shown as *<item>* is mandatory and must be entered with the command.
- When *<item>* | *<item>* is shown, one of them must be specified.
- Parameters *[Item]* in brackets are optional.

Note: When entering multiple items, such as commands and parameters, separate them with one or more space characters. [ ] and < > are used for clarity and are not typed as part of the command string.

Command	Description
.APLAY <fli>	Lets you play back the FLI sequence an indefinite number of times, or until the SYNC condition is met. (See **.SYNC** command.) The playback can be terminated at any time by hitting any key. **<fli>** is the name of an animation file created by Autodesk's Animator. These files use a .FLI extension.
.APLAY1 <fli>	Using this command, you can play an FLI sequence one time.
.DELAY <ttt>	Sets a delay time from one command to the next command. **<ttt>** is measured in .01 seconds. Example: 100 equals 1 second.
.PAUSE	Lets you pause until a key is hit.
.PLAY <fff>	Plays a .CMF FM music file.
.REPEAT <nnn>	Sets the number of times for the next command to repeat.

Continued on Next Page

Command	Description
. END	Ends the .REPEAT command. Place this command after the repeat command.
.SCREEN <0> | <1>	Control the clearing of screen at end of a presentation. If the parameter is **1**, the screen is cleared and restored to the original mode. If it is **0**, the screen remains in the 320x200 256-color mode.
.SYNC <Vn> | <Fn>	Specifies the termination condition for subsequent **.APLAY** commands. **V** is the voice using a .VOC file. **F** is FM music using a .CMF file. **n** is the marker value to match.
Note: Each Sound Blaster Pro driver for voice and FM music supports the embedding of markers into voice and music files. As the drivers process the files, they report the value of the markers encountered to MMPLAY. This makes it possible to synchronize the ending of a looping FLI sequence with the preceding music or voice. Normally, to wait for the end of a song or voice, the value **n** must be set to **0**. Only the last **.SYNC** command preceding the **.APLAY** command has an effect.	
.STOP <V> | <F>	Stops the Voice or FM music output immediately. **V** is the voice using a .VOC file. **F** is the FM music using a .CMF file.
.VOUT <fff>	Plays the .VOC digitized Voice file.
.WAIT <Vn> | <Fn>	Holds the presentation until a condition is met. (See the .SYNC command for parameters explanations.)
.EXECUTE <DOS command line>	Lets you execute a specified DOS command from MMPLAY. Returns to MMPLAY when the command is completed.

File Extensions

If a file in the script called for does not have an extension, the following default extensions are assumed:

- .PLAY music file - .CMF
- .VOUT voice file - .VOC
- .APLAY FLI file - .FLI
- .APLAY1 FLI file - .FLI

Drivers

MMPlay expects the following drivers to be available:

- **Voice**—The CT-VOICE.DRV driver must be present in the DRV subdirectory of the path specified by the Set Sound command, or in the current directory.
- **FM music**—SBFMDRV.COM driver is loaded by the user.

Note: Except for CT-VOICE.DRV, you do not need to load other drivers unless your presentation calls for them. MMPlay always loads the CT-VOICE driver.

Sound Blaster Pro Extensions to MMPlay

MMPLAY has added the following new commands to support playing CD audio and Mixer volume controls on the Sound Blaster Pro.

Command	Description
.VOLUME <*source*> <*lll*> <*rrr*>	Sets the left and right volume of selected sound source. Sound source can be one of the following: **Voice, Line, CD, Mic, Music** or **Master** Volume levels for **<*lll*>** and **<*rrr*>** range from 0 to 255. The default value is **200**.
.PLAYCD <ttt> [sss [ddd]]	Plays the CD-ROM drive and specifies track number, time offset from beginning of song, and duration of play set in **<ttt> [sss[ddd]]**. For example, if you want to play the fifth song on the CD, then **<ttt>** equals 5.

Continued on Next Page

Command	Description
	Audio playback can start from an offset in terms of seconds specified in **[sss]**. If this is not specified, play starts from the beginning of the track. The duration of the playback is specified in **[ddd]** in terms of seconds. If this is not specified, the CD will play till the end of the disk. For example: **PLAYCD 5 10 30** Starts the CD playing from the 10th second of the 5th song for 30 seconds.
.STOPCD	Stops the CD music.

Script & Batch File Example

This sample batch file MMDEMO.BAT starts MMPLAY and calls the script file, MMDEMO.ACT.

Batch File

(Sample batch file MMDEMO.BAT)

```
\SBPRO\SBFMDRV
MMPLAY MMDEMO.ACT
\SBPRO\SBFMDRV /u
```

Script File

(Sample script file MMDEMO.ACT)

```
.VOLUME   MASTER    240   240
.VOLUME   VOICE     96    96
.VOLUME   MUSIC     240   240
.VOLUME   CD        0     0
.VOLUME   MIC       0     0
.VOLUME   LINE      0     0
.PLAY     FAIRY     <- Play music file FAIRY.CMF in Background
.DELAY    300       <- Delay for 3 seconds
.APLAY1   Z2
.REPEAT   2         <- Play the animation file Z2.FLI once
.VOUT     BREATH2   <- Play voice file BREATH2.VOC 2 times
.END
.APLAY1   Z1
.VOLUME   VOICE     160   160
.VOUT     ELE
.APLAY1   DOT
.VOLUME   VOICE     0     240
.VOUT     SQ1
```

Troubleshooting

When MMPLAY encounters an error, it displays an error message with the line number and the command.

If sound or music is not heard:

- Check that the relevant driver is loaded.
- Make sure drivers are installed with the correct I/O address and Interrupt number. Refer to the section on installing drivers.
- Make sure the BLASTER environment matches the correct I/O address and interrupt number.
- Remove other TSRs (memory resident programs) if you suspect interference from them.

Chapter 7

CD Player

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CD PLAYER

Getting Started

CD Player gives you full control over an attached CD-ROM drive. Using CD Player requires two drivers: one is a hardware-dependent device driver. Software reference to this drivers is normally placed in the CONFIG.SYS file. The second drivers is Microsoft's executable program, MSCDEX. Refer to your CD-ROM drive installation manual for additional installation instructions.

➢ Entry format:

MSCDEX ***/D:device-name*** **[*M/:n*][/E][*/V*][*/L:drive-letter*]**

Optional Parameters Table

Parameter	Description
/D:device-name	Specifies the name of the device driver. This name must be identical to the device name used in the CONFIG.SYS file.
/M:n	Specify the number of sector buffers used to cache the path table of a CD-ROM disc. Typically, each drive has a minimum of four to five buffers. The larger this number, the less your PC has to read directly from the CD-ROM drive.
/E	Tells MSCDEX.EXE to use expanded memory if your system is using expanded memory.
/V	Displays memory usage when booting your PC.
/L	Assigns letter name to the first CD-ROM drive.

Note: Parameters are enclosed in brackets. Do not type brackets or colons when entering program command line. Suggested parameters are included in the documentation that comes with your CD-ROM drive. (Suggested parameters are included in the documentation that comes with your CD-ROM drive.)

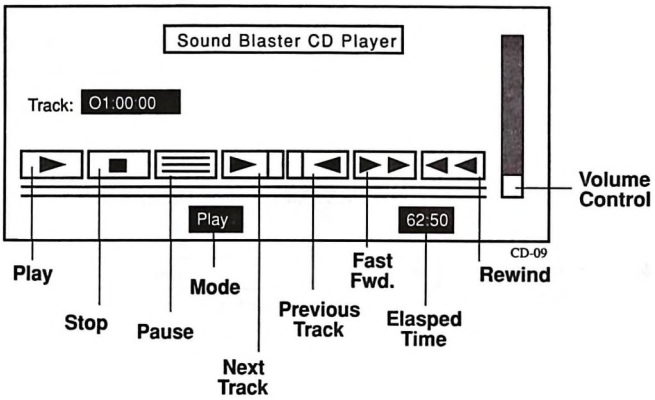
Using CD Player

Once you have correctly loaded the two drivers, you can then run CD Player.

To run CD Player:

1. Change to the **SBPRO** director and type **CDPLYR** then press Enter. This esxecutes a batch file to start the program.
2. Select the desired CD Player control button (see button table).

Sound Blaster CD Player Control Screen



The control screen displays current track information, time current track has played, current operation and audio disc volume.

Icon-type control buttons operate the CD-ROM drive. You can execute functions using either the keyboard or a mouse. From the keyboard, move between controls by using the **Arrow** keys and press the **Enter** key to start the operation. The control button is highlighted when selected.

Button Descriptions

Control	Description
Play	Starts the CD player. If already started, this will restart current track.
Stop	Stops the CD player .
Pause/Continue	Pauses the CD player until selected again to continue playing.
Next Track	Moves the CD player to the next track. If the disc's last track is encountered, it moves to the first track .
Previous Track	Selects the previous track. If the first track is encountered, it plays the final track.
Fast Forward	Fast-forwards the player by a 16 second count. If the end of disc is encountered, the function is ignored.
Rewind	Rewinds the player by a 16 second count. Function is ignored if the beginning of the disc is reached.
Volume	The volume control is controlled by a vertical bar at the right hand side. To change volume, move the control with the **Up** or **Down Arrow** keys until you reach the desired volume. With the mouse, simply select the right or left button. Left increases volume, Right decreases.

Chapter 8

FM Intelligent Organ

Stereo Version

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FM Intelligent Organ

The FM Intelligent Organ transforms your computer into an organ of incredible power and you into an instant musician. With one finger—or all ten, if you can manage. Learn to play complex musical pieces on your computer keyboard—the software adds the accompaniment (bass, chord and rhythm) in real-time.

The FM Organ includes a learn mode to help you master the keyboard—without stopping to learn music theory. And, if you have a MIDI-compatible keyboard, using our MIDI interface, increases your music-making capabilities tenfold.

Getting Started

To load:

1. Go to the **\SBPRO\PRO-ORG** directory.
2. Type **PRO-ORG** and press **Enter**.

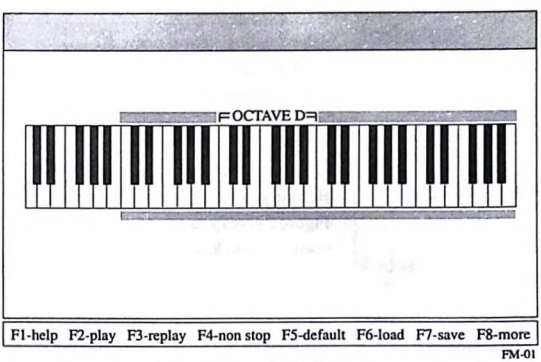


Figure 1 — Main Menu

If you have no fear of computers or keyboards, set this manual aside, press **F2** and begin playing with the keyboard. You can press the **F1** and the **Page Up** and **Down** keys to display a brief help summary of key definitions.

After playing around for a while, you will have a feel for the keys and how they are used. Then, when you need additional information, come back to the manual.

There is a song located in your **\SBPRO\PR-ORG** directory called **DEMO**. Feel free to load it in for replay, non-stop replay with all kinds of effects; changing instruments, accompaniments, tempo, etc. Go on and have a good time—you can't damage anything by playing the organ, and the **HELP** menu is always there to guide you.

To load a song:

1. Press **F6**.
2. Use the **Page Up** and **Down Arrow** keys to highlight and select a song from the list of songs displayed.
3. Press **F4** to play the song.

Important

*After loading, if you press **F2** to play the song, you will hear only the rhythm and arpeggio—**NOT** the melody. If you press **F2**, you will have to reload the song to play it with melody.*

Play Mode

Before you start pressing keys, you need to know which keys to play. Figure 2 gives you a good picture of the PC keyboard representation of the normal piano keys.

Keyboard Terminology

All keys of keyboard instruments are arranged in groups of 12 keys (5 black and 7 white keys). Each in this group is called an octave and the first white key of each Octave is a "DO", the second white key "RE", the third "MI" followed by "FA", "SO", "LA", "TI".

The Middle C is the "DO" note located at the middle of a piano keyboard and in the case of the Intelligent Organ, it is the "DO" note of the D Octave. This Organ program has a very large keyboard; the equivalent of a large organ keyboard. There are seven octaves available and, for convenience, we named them octaves A, B, C, D, E, F and G.

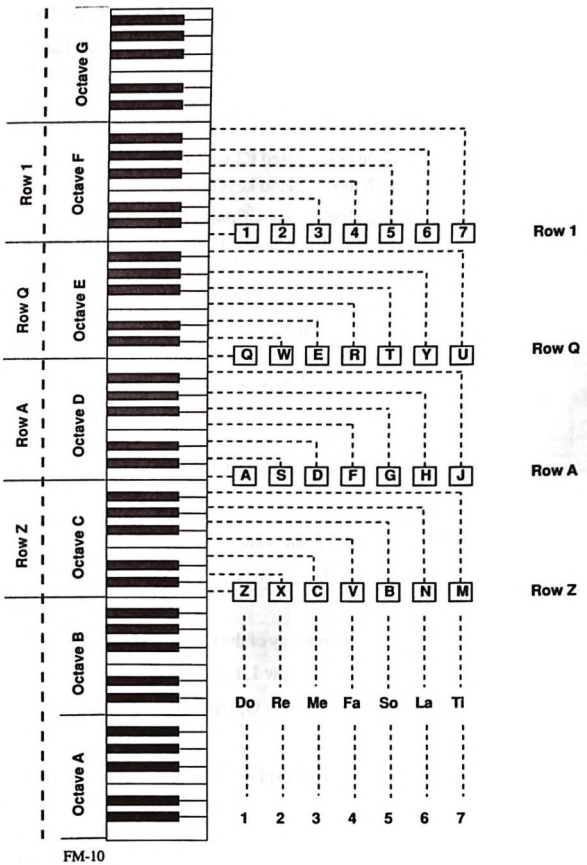


Figure 2 — Seven Octave Piano Keyboard on Your PC

Getting to Know Your Keyboard

At the main menu, press the **F2** function key to enter play mode.

Press the **Right** or **Left Arrow** keys to shift the green color bar above the organ keyboard. Notice that the position of the D octave is always indicated and that the length of the moving green bar always covers four octaves. These four octaves represent the four rows of keys on you PC keyboard, namely rows **1**, **Q**, **A**, and **Z**, used for playing the organ.

For example, if the D-Octave is at the left hand side of the green bar, it means that the row **Z** represents the D octave. On the other hand, if the D octave is shifted to the right side of the green bar, then row **1** represents the D octave.

Have you pressed **F2** yet? Go ahead, press **F2** and start messing around with those "piano keys".

Try playing any of these keys on your PC and you should hear the corresponding note. If you cannot hear any sound, please check the volume control on your sound card and refer to Appendix C: *Quick Reference for Problems Solving*.

You can actually go on playing (or messing around) for hours. Before you *show off* your musical talent, however, let's get a bit more sophisticated so we can *show* you what this organ can do.

For those of you who don't seem to be able to find something to play, you can try one of the old favourite tunes on page 8-7 and 8-8. You play by simply pressing he keys that correspond to the numbers on the notes.

Example

The first 7 notes are:

(① ① ⑤ ⑤ ⑥ ⑥ ⑤)

You can use any of the four octaves, that is, any of the four rows to play.

If you chose row **1**, type: (1 1 5 5 6 6 5)

If you chose row **Q**, type: (Q Q T T Y Y T)

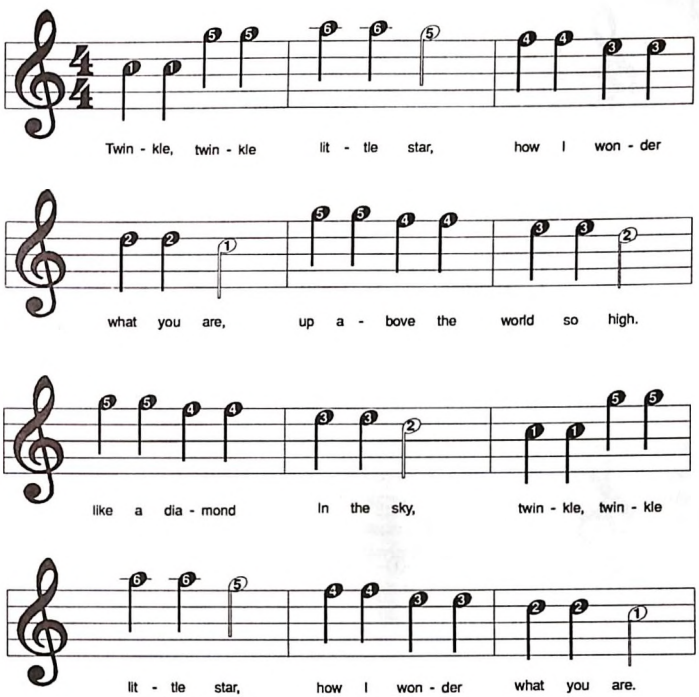
After you finish playing the song, let's try playing it differently. This time press the **spacebar** first and start playing when the number counting on the top-left corner is **1**. You will hear beautiful background music added to what you are playing. Press **Esc** to when you want to quit the Play mode.

TWINKLE, TWINKLE, LITTLE STAR

(filename : TWINKLE)

KEY 1=C

Rhythm = March

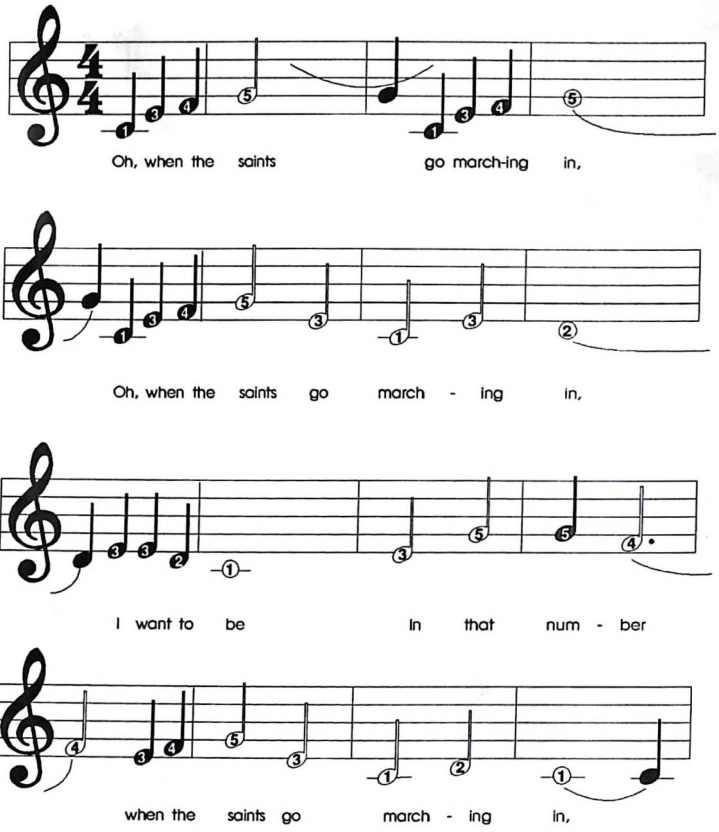

Twin - kle, twin - kle lit - tle star, how I won - der
what you are, up a - bove the world so high.
like a dia - mond In the sky, twin - kle, twin - kle
lit - tle star, how I won - der what you are.

WHEN THE SAINTS GO MARCHING IN

(filename : SAINTS)

KEY 1=C

Rhythm = March


Oh, when the saints go march-ing in,
Oh, when the saints go march - ing in,
I want to be in that num - ber
when the saints go march - ing in,

Save, Load & Replay

Since this is your first song on the Organ, we are sure you would like to save it to show your friends.

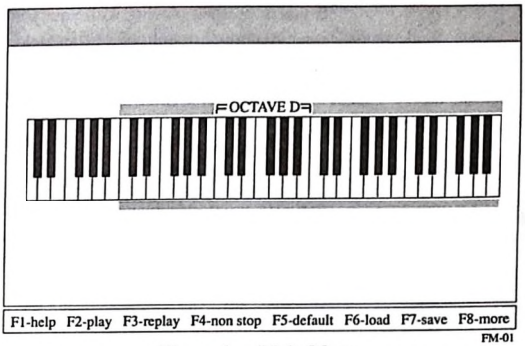


Figure 4 — Main Menu

Saving a File

To save a file, press function key **F7,** and at the prompt, enter the name fo the song. For example, let's call it **MYSONG1**. Once you have entered the file name, press **Enter**. The song is now saved to disk.

The Intelligent Organ actually *remembers* the song you are playing by storing it temporarily in a reserved memory area in your computer call the buffer. The buffer is 64K and under normal conditions, the words "Buffer Status" in the bottom-right corner are blue. When the buffer is almost full, they begin flashing red and when the buffer is full, they become a steady red.

Perhaps you would like to play the song again before you save it. Press **F4** to play again. Press **F7** to save the song or **Esc** to quit.

Loading a File

Just to make sure that you have saved your song correctly, press **F2** to go to the PLAY mode and then press the **Esc** key to return to the main menu—going directly to the PLAY mode wipes out the song stored in the buffer.

Now press **F6** to display a pop up window containing all the songs titles on your disk. Simply move the cursor to select your song and press Enter. This loads the song into memory.

Non-Stop Replay

To play your song, press **F4.** The song plays repeatedly until you press the Esc key. You may make changes to your song while in the non-stop mode, but the changes made are temporary and are not be saved in the buffer.

If you're finished playing with your song, let's try loading the DEMO song. At the main menu press **F6** and select **DEMO** from the song list and press **Enter**. Next, press **F4** for non-stop play. Now we can modify the song such as changing instruments, rhythym, etc. Go on, the power is with you, turn the song upside down. Try loading other songs for a non-stop play. Have fun!

To save changes, press **F3** to replay. In this mode, the song replays once and to hear the song again, press **F3** again. Changes made in the replay mode are stored in the buffer. However, to avoid modifying the DEMO song permanently, enter a different song title such as DEMO2 when asked for a filename before saving.

Instruments and Accompaniments

Press **F2** to get to PLAY mode. Notice the menu in the PLAY mode? Try pressing function keys **F1** to **F4** and what do you notice? Some words in the main menu begin to change color.

Go on, choose something and start to play your tune. You can change instruments any time you fancy — simply press any of the keys **F1** to **F4**.

Each function key actually supports five instruments giving a total of 20 instruments. Pressing a function key lets you to switch between the five instruments.

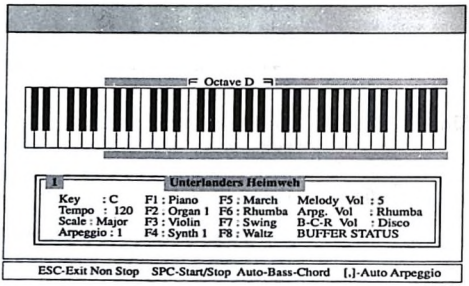


Figure 4 — Play Menu

Instrument and Accompaniment Table

	Function Keys			
	F1	**F2**	**F3**	**F4**
Instruments	Piano	Trumpet	Flute	Sitar
	Harp	Saxafone	Harmonica	Jamican
	Elguitar	Trombone	Clarinet	Bells
	Marimba	Mars	Violin	Synth1
	Alien	Organ1	Oboe	Synbass
	Function Keys			
	F1	**F2**	**F3**	**F4**
Rhythms	March	Rhumba	Swing	Waltz
	March1	Samba1	Sw.ng1	Waltz1
	March2	Bosonov1	Rock & Roll	Waltz2
	March68	Tango1	Disco1	Jwaltz

Auto-Bass-Chord

You have probably found that playing a simple tune is not so difficult after all, but most tunes are not simple. They normally come with some background sound called accompaniment. The accompaniment enriches the quality (in most cases) of the main melody by adding bass, chord and rhythms.

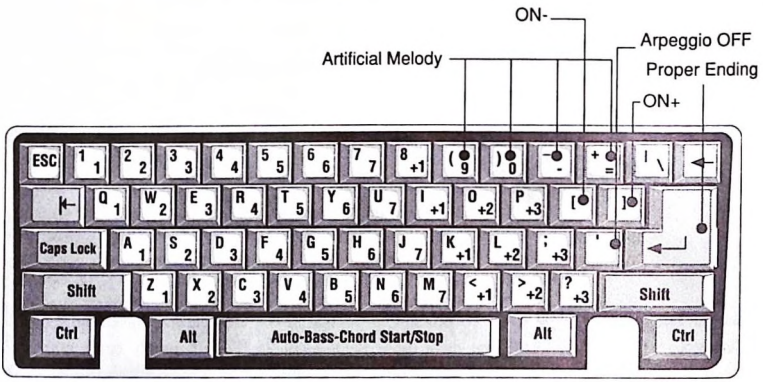
Bored? For some action simply press the **spacebar** to turn the accompaniment on. To turn off the accompaniment, press the **spacebar** once more.

The intelligence of the Intelligent Organ lies in the fact that it is capable of adding the correct accompaniments to what you play—in real-time!

Certain accompaniment will suit some songs better than others and the Intelligent Organ gives you a choice of 16 different accompaniments. Try changing the accompaniment by pressing function keys **F5** to **F8**.

To sound right, most songs have a proper ending so they do not end abruptly. Try ending the auto accompaniment for various types of Auto-Bass-Chord accompaniment by pressing the **Enter** key.

Now, with more power at your finger tips, you are ready to take on the "Twinkle, Twinkle, Little Star" again and mesmerize your audience with a vastly sophisticated version. Choose an instrument you like and select **March** for your Auto-Bass-Chord accompaniment. Don't forget to give your song a proper ending before saving. If you don't want to overwrite your original song, name this one **MYSONG2**.

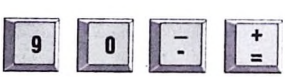


Auto Arpeggio

Ready for more fun? In addition to the Auto-Bass-Chord accompaniment, the Intelligent Organ gives a further enhancement to your songs by providing an Auto Arpeggio—automatically adding a built-in harmonious melody to accompany your main melody. You can select any one of the six arpeggios using the **Right** and **Left Bracket** [ ] keys. Now add more spice to MYSONG2 using Auto Arpeggio. That's a good way to find out which sounds better. Use the ' key to stop the Auto-Arpeggio (Refer to Figure 5).

Artificial Melody

Instead of the Auto-Arpeggio, you can also add a string of melodies to what you are playing. This artificial melody is provided by pressing one of the following four keys.



The best effect is achieved by pressing one of the artificial melody keys during the long notes of your song. For example, press **9** to get a trill on the last note played.

Tempo Control

The jumping numbers at the top-left hand corner of your PLAY menu are actually the beat count provided by the Intelligent Organ to assist you in getting your tempo correct. You can vary the tempo by pressing:

- **Ins**—Increase Speed
- **Del**—Decrease Speed

If you are still struggling to get your song right, because you cannot keep up with the pace of the song, don't despair. Simply decrease the tempo until you can key in your song comfortably. Add Auto-Bass-Chord and Arpeggio and you will still get to your sophisticated piece somehow. You can then increase the tempo gradually as your skill gets better. (To Cheat a little, play your song in a slow tempo and replay it its regular tempo.)

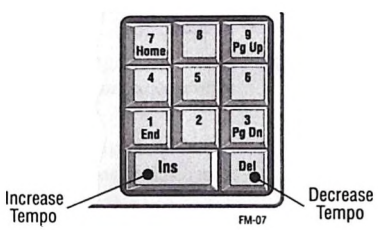


Figure 6 — Tempo Increase/Decreae Keys

Volume Controls

Besides the manual volume control on the Sound Blaster Pro, the Intelligent Organ has three individually volume controls: Melody, Auto-Bass-Chord and Auto Arpeggio. You can adjust them individually to get the best sound effect for your songs.

Important

Now, here is some serious advice. Spend some time to master one song. If you can master one, you can master them all.

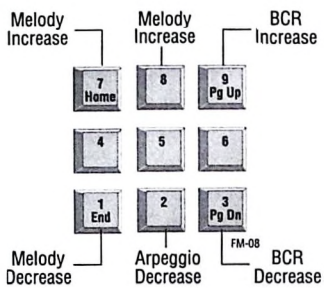


Figure 7 — Volume Control

Some Music Fundamentals

Earlier we mentioned that it was possible to play the FM Intelligent Organ without stopping to learn music theroy. While that is true, we would like to offer some music fundamentals to help you along.

Time Signatures

At the beginning of a musical score, there is always a Time Signature. The most common are:

$\frac{3}{4}$ and $\frac{4}{4}$ which denote 3 beats and 4 beats respectively.

For songs with 3/4 time signature, you should use only the waltz-type rhythms found on **F8**.

Major/ Minor Scale Selection

Most songs can be categorized into two groups.

- Major Scale Accompaniments (F9)
- Minor Scale Accompaniments (F10)

As a rule of thumb, major-scaled songs begin with a major chord or end with **1**(DO)—the first note of its key. Minor-scaled songs begin with a minor chord (Eg. Am, Em, Dm,...) or end with **6** (LA) — the sixth note of its key.

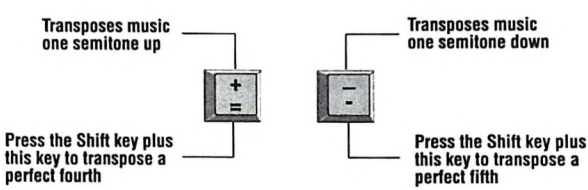
For songs to sound proper, for major-scaled songs, use Major Scale Accompaniment **F9**, and for minor-scaled songs, use Minor Scale Accompaniment **F10**.

Generally speaking, use **F9** major accompaniment unless the songs ends with **6** (LA) or begins with a minor chord; then choose **F10** minor accompaniment.

Transposing

Not every song is written in C key (1=C) — i.e. C is the DO note. Some tunes sound better if they are played in a higher key, while others sound better in a lower key. Moving your DO, RE, MI, etc. to a higher or lower tone is called transposing. The Intelligent Organ has a very convenient one-touch way of transposing.

To hear the effect of transposing, go to the main menu and press **F6** to load a song. Next press **F4** for non-stop play and while the song is being played, press the following keys.


Transposes music one semitone up
+
=
Press the Shift key plus this key to transpose a perfect fourth
Transposes music one semitone down
_
-
Press the Shift key plus this key to transpose a perfect fifth

Changing Octaves

There are seven octaves playable from the Sound Blaster Pro and four octaves directly accessible at any time from your PC keyboard. You can gain access to all seven by using the **Right** and **Left Arrow** keys on the numeric key pad to shift octaves.

Black Keys and the Small Keyboard

Besides the four octave keyboard, the Intelligent Organ also provides users with a small keyboard with directly accessible *Black Keys*. Those who would like to play the Black Keys, press the **Tab** key to toggle the small keyboard with only two octaves (See figure 8).

The four rows become:

- Row 1—Black keys (Octave E)
- Row Q—White keys (Octave E)
- Row A—Black keys (Octave D)
- Row Z—White keys (Octave D)

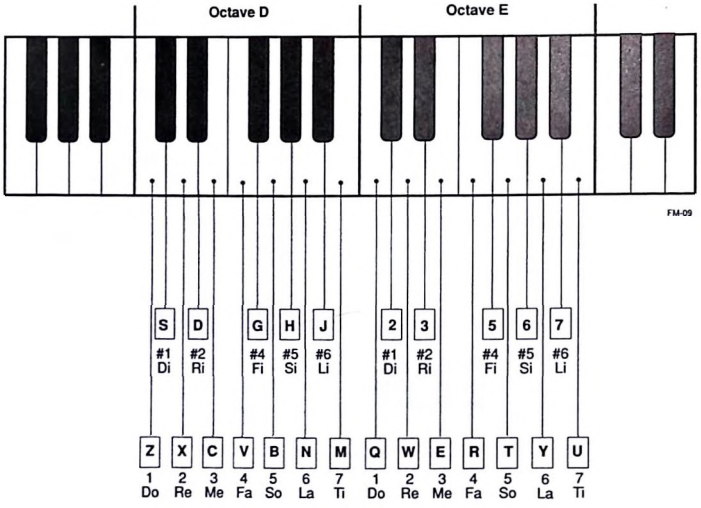


Figure 8 — Small Keyboard Layout

If the black keys are accidentals, which occur rarely in your songs, you can play the black keys on the big keyboard by holding **Shift** key down while playing.

Default Settings

The defaults for functions like instruments, rhythm styles, speed, title of songs, etc. can be set by pressing **F5** from the main menu. When in the Default Setting mode, you can use the Up and Down Arrow key to select the function. Alternatively you can jump to that function by pressing the highlighted character. Next use the Right or Left Arrown to move through the various options available Stop at the option you want to change.

To enter the title of the song you must press **T.** Title must not exceed 24 characters. After having set all the defaults, press **Enter** to end. Press **Esc** if you wish to quit without saving changes. Press **O** to restore all values to factory settings.

By setting the defaults:

- You can change instrument, accompaniment, etc. with one touch of a button.
- The default settings are saved with the songs.
- You can change defaults after playing or loading a song.

More Functions

Pressing **F8** from the main menu displays the following functions:

- F1 - LEARN—This function lets you to learn an organ song that is loaded in the memory buffer.
- F2 - PATH—Allows you to set the directory path for save and load.
- F3 - SHELL—Allows you to shell to DOS temporarily; for example, to perform a DIR command. Type **EXIT** at the DOS prompt to return to FM Intelligent Organ.
- F4 - QUIT—Quit the program.
- F5 - MIDI TOGGLE—Enters or exits MIDI mode.

Learn Mode

You enter the Learn Mode by pressing F8 from the Main menu and then pressing F1. The Learn Mode is an easy way to learn to play any organ song without becoming bogged down in music theory. It shows you how the song's notes are entered on the dPC keyboard.

To learn a song:

1. Press **F6** to load a song that you want to learn.
2. Now press **F8** and **F1** to enter the Learn Mode.
3. Press **F1** (demo) again to see a demonstration of how the keys ar typed.
4. Press **F2** (learn). This highlights in brown the upper half of the key. This is the warning signal for you to get ready to press this key. When the bar turn purple and drows to the bottom half of the key, this is the exact time you must press the key. If you do not press the key in time, the song will wait, until you press the correct key.

By practising a song repeatedly, it won't be long before you can play without assistance. If you have never played a musical instrument before, try it now, it can b e really exciting.

Using the MIDI Mode

The FM Intelligent Organ supports the MIDI interface of the Sound Blaster Pro card. Using the MIDI interface, you can play the FM Intelligent Organ using a normal organ keyboard. You can play with one hand and have the Intelligent Organ add the accompaniments for you.

To use the MIDI Mode

1. You need to get an electronic organ keyboard or synthesizer that has a MIDI interface. Use Creative's MIDI Kit to connnect the MIDI instrument.
2. Connect the MIDI Kit to the Joystick Connector on the Sound Blaster Pro card.
3. Plug the MIDI cable from the MIDI-IN on the MIDI Kit to the MIDI-OUT on the MIDI keyboard.
4. Switch on the MIDI keyboard and set it to MIDI mode (Refer to your MIDI instrument's manual for details).

5. Start up the FM Intelligent Organ.
6. Press Function Key **F8** (more) then **F5** (midi-toggle). This activates the MIDI mode of the FM Intelligent Organ and enable it to receive MIDI codes from MIDI keyboards. You can still use the PC keyboard to play notes and change the ORGAN functions.
7. When the MIDI mode window displays, select the key signature that your are going to play. This is necessary so the FM Intelligent Organ can add the correct accompaniments to your song.
8. Use the **Arrow** keys to change to the desired key signature. If you are not sure, count the number of sharps or flats in the key signature of your music score. Match the number of sharps or flats with those on the windows.
   - **Up Arrow**—Increases number of sharps or decreases number of flats
   - **Down Arrow**—Decreases number of sharps or increases number of flats
   - **Left Arrow**—Lowers one semitone
   - **Right Arrow**—Raise one semitone
9. When you've selected the desired key signature, press **Enter** to return to the main menu. The MIDI mode is now turned **ON**.
10. Press **F2** to play. You can now play on the MIDI keyboard as well. The use of the MIDI keyboard doesn't hamper the functions of the FM Intelligent Organ. You can still change instruments, rhythms, tempo, keys, etc. using the PC's keyboard.
11. If your song changes key signature midway through the song, you must also let FM Intelligent Organ know. Use the transpose functions; **Shift +** or **Shift -** on the numeric keypad to match the key signature on the screen with that you are playing.
12. When you save a song played on the MIDI keyboard, you may play back the song like any other FM Organ song played on the PC's keyboard. You can't hear the tunes from the MIDI keyboard since the MIDI-Out to the MIDI keyboard is not implemented.

13. The song you save is transposed to its *natural key signature*—the key signature where the song can be played without any black keys. During play back, the FM Organ transposes it back to the original key signature. This has the advantage, that your song could be easily *learned* by others using the Lean mode.
14. To end the MIDI mode, press **F8** and **F5**.

Chapter 9

Working With Windows

Featuring JukeBox & Pro Mixer Control for Windows 3.0

Contents

Getting Started 9-3
Using JukeBox 9-5
Using SBMixer 9-7

Windows 3.0 Applications

Getting Started

For Windows 3.0 users, we have included two Sound Blaster Pro application programs to let you *see* and *hear* how easily the Sound Blaster Pro integrates with Windows 3.0. We have also included SETUP to help you make the necessary Sound Blaster Pro settings in the Windows 3.0 WIN.INI file.

Important

If you are interested in developing Windows 3.0 applications, check with your dealer or distributor for Windows SBK (Sound Blaster Developer Kit). This kit provides all the information you need to add the impact of Sound Blaster Pro audio to your Windows programs.

Naturally, running these programs requires Microsoft Windows 3.0 installed in your system. The programs included are:

- **Jukebox**
- **Sound Blaster Pro Mixer Control**
- **Setup**

Installation

Installation is relatively easy. However, you need to follow these instructions closely. If you have any problem running these applications, check your installation.

Moving the DLL

The DLL (Dynamic-Link Library) is necessary for Windows applications. We have included the Sound Blaster DLL (SNDBLST.DLL). You should move the DLL to the Windows directory so you can use it with other Sound Blaster Pro Windows applications.

To move the DLL:

1. Change to the **\SBPRO\WINDOWS** subdirectory.
2. Copy **SNDBLST.DLL** to the **WINDOWS** directory (Normally this is in **C:\WINDOWS**).
3. Delete the **SNDBLST.DLL** file in the **\SBPRO\WINDOWS** subdirectory.

Setting the Windows Environment

To keep your Windows neat, and your Sound Blaster Pro programs easier to find and execute, create a program group for the Sound Blaster Pro Windows 3.0 applications.

To create the program group:

1. Under **Program Manager**, select the **File** menu, then select **New**.
2. Select **Program Group** in the dialog box.
3. Type **Sound Blaster Pro** in the Description box and click on the **Ok** button or press **Enter**. This causes a blank window titled *Sound Blaster Pro* to display.
4. Select **File, New** and **Program Item**.
5. Type **JukeBox** in the Description box and type **C:\SBPRO\WINDOWS\JUKEBOX** in the Command Line box. An icon representing JukeBox will display in the Sound Blaster Pro Window.
6. Repeat steps four and five, except this time type **Mixer** for the Description and type **C:\SBPRO\WINDOWS\SBMIXER** in the Command Line. This diplays the Mixer icon.
7. Repeat steps four and five, except type **Setup** for the Description and enter **C:\SBPRO\WINDOWS\SETUP** in the Command Line. This displays the Setup icon.

Note: These steps assume you have installed the programs in your **C:** drive and the **\SBPRO\WINDOWS** subdirectory.

Setting the WIN.INI Configuration

The WIN.INI file, normally found in the Windows directory, contains information required by Windows to run applications correctly. To let Windows know the Sound Blaster Pro I/O, Interrupt and DMA channel settings, it is necessary to place these settings in the WIN.INI file. Since WIN.INI is an ASCII file, you can use a word processor or text editor to add the Sound Blaster Pro settings. The file must be stored in ASCII.

However, we have made it easier for you to change the WIN.INI file by including Setup, our Windows setup program. Using this program you can scan the current hardware configuration, enter settings, or have the program add the following defaults to the WIN.INI file:

[SoundBlaster]
Port=220
Int=7
DMA=1

Note: **Port** refers to the Sound Blaster Pro I/O address; **Int** is the DAC (Digital to Analog Converter) interrupt and **DMA** is the Direct Memory Access Channel.

If you have changed the jumper settings on the Sound Blaster Pro card, you need to change the settings in the WIN.INI file to match.

Selecting Auto Scan in Setup lets you scan the current hardware configuration. You can then manually enter the I/O port address, interrupt and DMA channel settings. After verifying the settings, Setup makes the necessary changes in the WIN.INI file.

To run setup:

1. Double click on the **Setup** icon in the Sound Blaster Pro window.
2. When the dialog box appears, select the card you have installed: **Sound Blaster** or **Sound Blaster Pro.**
3. When the I/O port dialog box appears, the default is selected. If it has not been changed, select **Ok.** If the setting is not correct, a message box appears telling you that the setting is incorrect and returns you to the dialog box.
4. Similarly, when the Interrupt and DMA dialog boxes display, you can choose to either change setting or keep the default settings.

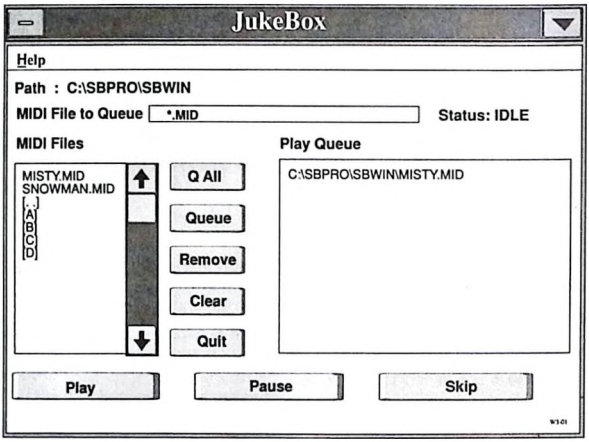
Using JukeBox

JukeBox plays MIDI files (files with extension .MID) and provides a demonstration of the Sound Blaster Pro in the Windows 3.0 environment. The program was written using the Microsoft Windows Development Kit and the Sound Blaster Developer Kit (SBK for Windows).

JukeBox uses the same conventions as most Windows applications. You can use the mouse or the keyboard to make selections. You can double click with the left mouse button to select files or change directories. Without a mouse you can use the **Tab** key to move from option to option.

When the desired function is highlighted, press the **Enter** key to execute this operation. You can also use the **Alt** key and the underlined character to select menu items.

The MIDI files list displays only files with the .MID extension. We have included some sample files for you to play with. The Play Queue box is where you place the MIDI files to play. The MIDI files are played in the order they appear. You can skip or remove a file at any time.



Button Control Table

Button	Description
Q All	Pressing this button places all MIDI files in the Play Queue.
Queue	This button is used to place a selected MIDI file in the Play Queue. Select (highlight) a file and then press the Queue button. MIDI files can be placed in the Play Queue in any order. You can place a file in the Play Queue by double clicking on the file in the MIDI files box.
Remove	This removes a file from the Play Queue. Select a file in the Play Queue and press the Remove button. If a file is not selected, the first file is removed.

Continued on Next Page

Button	Description
Clear	Press this button to clear all files from the Play Queue box.
Quit	Quits the program.
Play/Stop	This button starts and stops the JukeBox playing songs in the Play Queue. The name on the button changes to reflect the current mode. To play, a file must be in the Play Queue. When the song is finished playing, the file disappears from the Play Queue.
Pause/ Continue	Press this button to pause the JukeBox at the current song. The button changes to say **Continue**. The JukeBox remains paused until the Continue button is pressed.
Skip	Skips to the next song in the Play Queue.

Using SBMixer

SBMixer lets you control individual volumes from different sources and lets you test input levels of Analog to Digital Conversion (ADC) sound. Using Windows 3.0, you can run SBMixer the same time as JukeBox. You can actually use JukeBox to play music in the background while using the microphone to sing along with your favorite song.

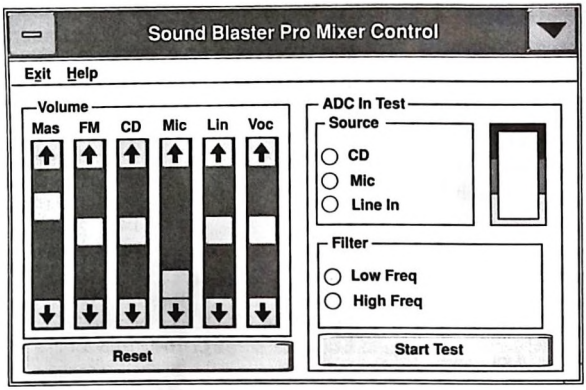
Moving Around SBMixer

Moving around SBMixer is simple. You can use either the mouse or keyboard to select or highlight options. Use mouse or **Tab** key to move from option to option. Use the **Up** and **Down Arrow** keys to move the scroll bars.

Volume Controls

Volume Controls:

- **MAS** - The Master volume control.
- **FM** - FM Music
- **CD** - CD Player
- **Mic** - Microphone - default is 0.
- **Lin** - Line In
- **Voc** - Voice



Button Descriptions

- **Reset** - Resets all volumes to their default levels.
- **Start Test** - Starts the input source test

ADC In Test

The ADC In Test lets the user see a graphic representation of sound level from a selected source.

To test:

1. Select source
2. Select filter
3. Press the Start Test button.

When sound is heard, a bar will appear in the box next to the Source box. This bar will reflect sound level changes.

Selecting Filters

Selecting either the high or low frequency filter is a matter of individual taste. Play around with filter selection to see what sounds better to you.

Chapter 10

Sound Blaster's SBSIM

A Sound Blaster Standard Programming Tool

Contents

Getting Started 10-3
Using the SB Standard Programming Tool 10-7
Using SBSIM with other Programs 10-7
Using the Voice Program 10-8
Using the Music Program 10-10
Using the SoundFX Program 10-12

Sound Blaster's SBSIM

Getting Started

The Sound Blaster Standard Programing Tool (SBSIM) is resident memory driver that uses a configuration file to load and unload the various Sound Blaster drivers (CT-VOICE, CTVDSK or AUXDRV) into memory. SBSIM lets external programs share access to the drivers. The SBSIM consist of a basic set of commands that start sound output and is consistent for all three sound drivers. This provides a simple method of programming applications to utilize the Sound Blaster Pro card.

SBSIM advantages:

- Relief from the drudgery of loading and unloading Sound Blaster sound drivers.
- Flexibility in choosing the driver to load for your application
- Easy programming method for playing CMF and VOC files with a simple and consistent command set.
- Access to the same piece of music or voice from different DOS applications at the same time.
- Full use of extended memory to play VOC files, taking advantage of SBSIM's close coupling with the CT-VOICE driver.

Those are just a few of the thing that the SBSIM can do for you. This approach frees application programs from loading drivers and the associated task of allocating memory for the drivers. SBSIM takes care of starting up, initializing and terminating the drivers along with loading music and voice files for the sound drivers.

If the CT-VOICE driver is loaded and extended memory support indicated, SBSIM's can load voice files into extended memory, allocating and freeing enough memory for the file. It can also use extended memory block that has been allocated by other programs. This new, simple way of utilizing your Sound Blaster Pro card frees the application programs from extended memory programming.

Configuration Files

The configuration file is a simple text-based file used by SBSIM. You create and edit these file using a word processor or text editor such as EDLIN. All files must be saved in ASCII format.

Configuration file specifies which drivers to load in memory plus the setup parameters for each driver. This lets you tailor the configuration file to suit your application's needs.

SBSIM reads configuration files when it starts up and loads the drivers specified in the file. After starting up, configuration cannot be changed. To use a different configuration file, it is necessary to unload SBSIM first, then reload SBSIM with another configuration file.

A configuration file consist of several sections. Each section specifies which Sound Blaster driver is loaded. These drivers are indicated by a keyword identifying the driver.

```
;=============================================
; This is a sample SBSIM configuration file
;=============================================
;
; Load FM driver
;
[FM]
BufferSize=16 ;Use buffer size of 16 kilobytes
;
;Load the CT-Voice Driver
;
[MemVoice]
ExtendedMemory=ON ;use extended memory
SBSIMhandles=5  ;allocate only 5 handles
;
;=============================================
```

You can only load divers identified by their keyword. You can add optional parameters—one per line for each driver (see sample configuration file and section on setting parameters.)

Since the FM driver SBFMDRV is a resident driver, it cannot be loaded by SBSIM. You must manually load the FM driver prior to running SBSIM which checks that SBFMDRV has been loaded.

Driver and Keywords Table

Driver	Keyword	Description
SBFMDRV	[FM]	FM driver
CT-Voice	[MemVoice]	Memory-mode voice drivers for conventional and extended memory
CTVDSK	[DskVoice]	Disk double-buffering voice driver
AUXDRV	[Auxiliary]	Auxiliary driver for Mixer control

Setting Parameters

There are two type of values for parameters:

- **Numeric** — These are decimal values.
- **On/Off** — Sometimes referred to as Boolean, these values use the words ON and OFF for true and false values.

SBSIM uses a default value for the parameters if one isn't specified. You can also insert comments in the file by placing a semicolon in front of the comment.

Parameters and Settings

Driver	Keyword	Option
SBFMDRV.COM	[FM]	*BufferSize= nn*
Buffer size default is ***32K***. If the buffer size is set to 0 (zero), SBSIM does not allocate a buffer for CMF files. The application must set aside its own buffer before starting CMF music. This prevents several application from using the same piece of music.		
CTVDSK.DRV	[DskVoice]	*BufferSize=nn*
Buffer size default is ***32K***. If the buffer size is set to 0 (zero), SBSIM does not allocate a buffer for VOC files. The application must set aside its own buffer before starting VOC output. This prevents several applications from using the same voice file.		
CT-VOICE.DRV	[MemVoice]	*ExtendedMemory=aa*
Default is ***OFF***. Setting ***aa*** to ***ON*** enables extended memory support for VOC files. An application program can load a VOC file into extended memory and later play the file through SBSIM or CT-VOICE.		
CT-VOICE.DRV	[MemVoice]	*SBSIMhandles=nn*
Default is ***10***. This parameter specifies the number of SBSIM handles to reserve. You can load several VOC files into extended memory and play them individually. The number of voice pieces you can place in extended memory is specified by this option. Each handle takes two bytes of conventional memory space. It is not advisable to allocate too many handles. If you specify SBSIMhandles as 0 (zero) in the configuration file, SBSIM allocates one.		
AUXDRV.DRV	[Auxiliary]	*CDswitchSpeaker=aa*
Where ***aa*** equals ***ON*** or ***OFF***. Default is ***OFF***. This option indicates whether to swap left-right speaker for Compact Disc output control by the Mixer. This switch allows the auxiliary driver to swap the control of the left and right outputs from the CD.		

How SBSIM Uses Extended Memory

SBSIM makes use of extended memory through its own set of handles, numbered from one onwards. These are SBSIM handles, not extended memory handles (although there is a one-to-on correspondence). You can specify the number of SBSIM handles in the configuration file using the ***SBSIMhandles=nn*** option.

Generally, to use SBSIM's extended memory method, an application loads a file into one of the SBSIM handles and subsequently tells SBSIM to play the voice file from the SBSIM handle. When the VOC file is not needed, the associated SBSIM handle is released along with the actual extended memory allocated for the file. SBSIM commands provide the ability to use this method.

The extended memory handler supported is HIMEM.SYS. If another extended memory manager is used, it must conform to Microsoft's Extended Memory Specifications Version 2.00 and above.

Using the Standard Programming Tool

To load SBSIM:

1. Change to the **\SBPRO\SBSIM** subdirectory.
2. Type **SBSIM** and press **Enter**.
3. To load **SBSIM** with a different or customized configuration file, type **SBSIM** followed by the name of the configuration file. For example, **SBSIM MUSIC.CFG.**

Note: SBSIM loads with the default configuration file SBSIM.CFG. You must enter path information for configuration files not in the same directory as SBSIM. **SBSIM C:\CONFIG\SBSIM\MUSIC.CFG** is an example.

To remove or unload SBSIM from memory:

1. From the \SBPRO\SBSIM subdirectory and type **SBSIM /*U***

Other command options include:

- ***/Q*** — Suppresses messages displayed to screen while loading.
- ***/H*** — Displays a help screen of available options.

Using SBSIM with other Programs

To get you started using SBSIM and to provide a better understanding of what the Sound Blaster Standard Programming Tool is all about, we have included three programs: Voice, Music and SoundFX. These programs let you play voice (.VOC) and music (.CMF) files from the DOS line in background mode and control fading and panning effects.

Note: You can use the default configuration file, SBSIM.CFG, create your own or customize the default configuration file. If your configuration file has a name other than SBSIM.CFG you must enter it after SBSIM. Refer to the section on using SBSIM.

Using the Voice Program

To use Voice:

1. Change to the **\SBPRO\SBSIM** subdirectory.
2. Type **SBSIM** and press **Enter**.
3. Type **VOICE** along with any of the following options.

Voice Options

You can specify one or more of the following options or switches. The program processes these options from left to right. Some of the options require additional parameters.

Option	Description
/Debug	This options turns on the debug mode. Error messages are not displayed on unless this option is set to ON. Usually, this option precedes other options and displays error messages for other options in the command line.
/OUT:filename	This option plays the voice file specified by filename. The path must be specified if the voice file is not in the same directory. Default .VOC file extension is used if one is not specified.
/OUTX:SBSIMhandle	Plays voice data from extended memory that was loaded into the requested SBSIM handle. CT-VOICE must be loaded with extended memory support indicated.
/WAIT:marker	Lets program wait until a marker value is encountered in the voice file, or until the voice output ends. Such markers can be inserted into the VOC file using the Voice Editor or Voice Utilities (Chapters 4 and 5).
/STOP	Stops playing of voice file.
/PAUSE	Pauses playing voice file. The ***/CONTINUE*** options resumes playback.
/CONTINUE	Resumes paused voice file.
/SPEAKER:on / off	Turns speakers **ON** or **OFF**.

Continued On Next Page

Option	Description
/LOADXMS:SBSIM handle filename	This switch loads the voice file into the SBSIM handle given by parameter ***SBSIMhandle***. This can range from one to a maximum number handles specified in the configuration file (default is 10). The path of the voice file can be specified in the filename if not in the same directory. Default voice file extension is .VOC. A voice file can be loaded into any free SBSIM handle. If a particular SBSIM handle already holds voice data not being played, this old data is erased and the new file loaded. If the SBSIM handle is playing from VOICE, LOADXMS will fail. LOADXMS also fails if there insufficient extended memory.
/FREEXMS:SBSIM handle	Frees a SBSIM handle while holding voice data. Use this option when a particular voice data is not required any longer. If a SBSIM handle is playing from VOICE, FREEXMS will fail.

Note: When using the extended memory commands /OUTX, /LOADXMS, and /FREEXM, have SBSIM load CT-VOICE with extended memory usage indicated.

Voice Program Command Line Examples

VOICE /SPEAKER:ON/OUT:TEST.VOC
This command turns on the speaker and plays the demo file TEST.VOC.

VOICE /STOP
Stops current voice from playing.

VOICE /OUT:TEST.VOC /WAIT:0
Plays the voice file TEST.VOC and return when the voice is completed.

VOICE /CONTINUE
Continues playing voice file.

VOICE /LOADXMS:1,TEST.VOC
Loads the voice file TEST.VOC into the SBSIM handle 1. Sufficient extended memory is required to hold the voice file.

VOICE /OUTX:1
Plays the voice data held in the SBSIM handle 1. A valid voice file must be loaded into the handle before this command is called. Refer to previous example.

VOICE /STOP /FREEXMS:1
Stops any active voice file and then frees SBSIM handle 1. Releases handle only after the voice data is not longer required.

Using the Music Program

The Music program lets you control CMF music from the DOS command line.

To run Music:

1. Change to the **\SBPRO\SBSIM** subdirectory.
2. Type **SBFMDRV** and press **Enter**.
3. Type **SBSIM** including any options then press **Enter**. (Refer to the SBSIM section on optional parameters.)
4. Type **MUSIC** along with any options (see *Music Options*) and press **Enter**.

Note: you can use the default configuration file or create your own. The file must have a line to handle FM music.

Music Options

Option	Description
/Debug	This option turns on the debug mode. Error messages are not displayed unless this option is set to **ON**. Usually, this option precedes other options and displays error messages for other options in the command line.
/PLAY filename	This option plays the music file specified by filename. The path must be specified if the voice file is not in the same directory. Default CMF file extension is used if one is not specified.

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Option	Description
/WAIT:mm	Lets program wait until ***mm*** marker value is encountered in the voice file, or until the musice output ends.
/STOP	Stops playing of voice file.
/PAUSE	Pauses playing voice file. The */CONTINUE* options resumes playback.
/CONTINUE	Resumes paused voice file..
/TEMPO: pp	Changes music speed. Tempo ***pp*** is entered as a percentage of the actual music speed. For example, to reduce the music speed to half of actual speed, type MUSIC /TEMPO:50. Changing the speed can defeat the musical effect. The Music program keeps the speed within a reasonable range to prevent it from going too fast or too slow.
/TRANSPOSE:ss	Transposes the music to a higher or lower key (pitch). The value ***ss*** entered can be either positive or negative. The entry range is from 12 to -12. The default is 0.
/REPEAT:rr	***rr*** is the number of times the music file plays. Setting repeat count to -1 causes the music to play continuously.

Music Program Examples

MUSIC /PLAY:RANGE.CMF
Plays the file RANGE.CMF. (It is not necessary to enter the .CMF extension.)

MUSIC /STOP
Stops playing current music file.

MUSIC /PLAY:RANGE.CMF /WAIT:80
Plays the file RANGE.CMF and return when the music file finishes playing or the marker 80 is encountered.

MUSIC /PLAY:RANGE.CMF /TEMPO:80 /TRANSPOSE:2
Plays the RANGE.CMF, changes its speed to 80 percent of actual speed and raised the pitch by two semitones.

MUSIC /PLAY:RANGE.CMF /WAIT:81 /PAUSE
Plays the file RANGE.CMF and waits for the marker 81. When the marker is encountered, it pauses the music. If the marker is not encountered, the program waits until the music file finishes playing.

MUSIC /PLAY:RANGE.CMF /CONTINUE
Resumes playing paused file RANGE.CMF.

Using the SoundFX Program

This program uses SBSIM to lets you control panning and fading sound effects.

- **Fading** — The process of gradually increasing (or decreasing) the sound volume until a certain level is reached.
- **Panning** — The process of having the sound move from right to left (or vice versa).

SoundFX can have fading and panning occur in the background so you can continue your current tasks without stopping these effects.

You can set fading and panning effects such as:

- **Duration** — Length of fade or pan.
- **Volume Level**— Right and Left channel volumes.
- **Repeat count** — Number of times fading or panning repeats.
- **Yo-yo Effect**— Fading to one sound level and then back to the original volume level creates the yo-yo effect. For panning, the yo-yo effect is created by panning from left to right and back to the right again (or vice versa).

You can set fading, panning and volume level for all sources:

- Master
- Voice
- Music
- CD
- Line
- Mic (Can set volume only. Does not work with fade or pan commands)

SoundFX Commands

Command	Descriptions
SOUNDFX GET	Lets you view the selected sources status: volume level, the panning and fading status Note: Source refers to the following: **MASTER, VOICE, MUSIC, CD, LINE** and/or **MIC**. You can request status for all sources and effects in the same command line. Example: **SOUNDFX GET VOICE FADE.**
SOUNDFX SETVOL	This command lets you set both left and right volume levels for selected sources. Values range from 0 (no sound) to 255 (loudest). If you omit the right volume level, both the right and left volumes are set to the specified left volume level. You cannot use this command if the source is currently being panned or faded. **Note:** Do **not** specify a right volume for **MIC.** Example: **SOUNDFX SETVOL LINE 255,80**
SOUNDFX FADE	This sets up the fading effect for the selected source. You can only select one source at a time with this command. The following options are available with this command: **BEGINVOL** — Set beginning volume level for right and left channels. Values range from 0 (no sound) to 255 (loudest sound). **ENDVOL** — Sets ending volume level for right and left channels. Values range from 0 to 255. **REPEAT** — Specifies Fade repeat count. If **-1** is specified, fading continues non-stop or until a **STOP** command is encountered. Default is **1.** **DURATION** — Specifies time value for length of fade in milliseconds. Default is **500** milliseconds. **YOYO** — Selects yo-yo feature either **ON** or **OFF.** Default is **ON.** Example: **SOUNDFX FADE MUSIC BEGINVOL 150,200 ENDVOL 35,35 REPEAT 2 DURATION 2000 YO-YO OFF** **Continued on Next Page**

Command	Descriptions
SOUNDFX PAN	Sets up the panning effect for the select source. You can only select one source at a time with this command. The following options are available with this command: **BEGINPOS** — Specifies the starting position of the panning. Values range from 0 (left most) to 255 (right most). Default is **0**. **ENDPOS** — Specifies the ending position. Values range from 0 to 255. Default is **255**. **REPEAT** — Specifies repeat count for panning effect. If **-1** is specified panning continues until a **STOP** command is encountered. Default is **1**. **DURATION** — Specifies time value for length of fade in milliseconds. Default is **500** milliseconds. **YOYO** — Selects yo-yo feature either **ON** or **OFF.** Default is **ON.** Example: **SOUNDFX PAN MUSIC BEGINPOS 35 ENDPOS 230 YOYO OFF REPEAT 2 DURATION 3000**
SOUNDFX START	Starts the panning and fading for all selected sources. Once fading and panning has started, you cannot set up the sources for more fading and panning without ending the current process first with the STOP command. Example: **SOUNDFX START VOICE**
SOUNDFX STOP	Stops the fading or panning for the specified source. If a source is not specified, this command stops all sources. Example: **SOUNDFX STOP MUSIC**
SOUNDFX PAUSE	Pauses the fading or panning process. Example: **SOUNDFX PAUSE**
SOUNDFX CONTINUE	Continues the fading or panning process Example: **SOUNDFX CONTINUE**

Note: You do not need to specify all options. Options not specified use the default value.

To use SoundFX:

1. Before using SoundFX, you need to run **SBSIM**. Also, your configuration file needs to load the **Auxiliary driver** (AUXDRV.DRV).
2. Start music and voice output using the **Voice** and **Music** programs.
3. Use the **SOUNDFX SETVOL** command to set the initial sound volumes for sources to be faded.
4. Use the **SOUNDFX FADE** command set up the sources to be faded.
5. Use the SOUNDFX **PAN** command to set up the sources to be panned.
6. Use the command **SOUNDFX START** to begin fading and panning for all the sources that have been set up.

More SoundFX Examples

SOUNDFX GET MASTER

Gets the current status for the Master volume. The output may be something like : **MASTER - L:128 R:128 PAN:OFF FADE:OFF**. This is interpreted as follows:

Left volume = 128
Right volume = 128
Panning not in effect
Fading not in effect

Note: If panning is in effect, the pan position appears in parenthesis after the PAN status.

SOUNDFX GET MASTER PAN

Gets the current panning status of the Master source. You might see something like: **MASTER - PAN:OFF**

SOUNDFX GET MASTER LINE

Gets the current full status for the Master and Line-in sources.

SOUNDFX SETVOL VOICE 230,80
Sets the volume of the Voice source to 230 left, and 80 right.

SOUNDFX FADE VOICE ENDVOL 0,0
Sets up yo-yo fading for the Voice source, does not repeat, duration is one half second (500 milliseconds), and ending at left volume 0, and right volume 0.

SOUNDFX PAN MUSIC BEGINPOS 40 ENDPOS 200 REPEAT 10 DURATION 10000
Sets up yo-yo panning for the Music source, repeats 10 times, duration is ten seconds (10000 milliseconds), starting at position 40 (near the left side), and ending at position 200 (near the right side).

SOUNDFX START
Start the fading and panning action. Assuming the previous two commands have been carried out, this **START** command starts fading for the Voice source, and panning for the Music source.

SOUNDFX STOP MUSIC
Stop the Music source panning action.

Chapter 11

Playing Music Files

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Playing Music Files

Playing music files is easy with the Sound Blaster Pro. We have included two programs, PlayMIDI and PlayCMF so you can play these music files formats from DOS. Since MIDI is the more popular of the two music formats, and since we also provide a MIDI port on the Sound Blaster Pro, we felt that you might like some additional information on just what exactly MIDI is.

Just What is MIDI?

The *Musical Instrument Digital Interface* (MIDI) is the international hardware/software standard. This standard specifies the cable, hardware interface and communications protocol for moving data from one MIDI device to another.

MIDI devices communicate with each other by sending codes through the MIDI interface. These MIDI codes are actually a musical score complete with sequence of notes, timing, and instrument designations. The synthesizer chip recognizes and interprets these codes and produces music. Please refer to the Appendix for synthesizer capablilities of the Sound Blaster Pro.

Understanding MIDI Terms

MIDI, like all computer-based, has it's own set of buzzwords. Sort of like a different language that can be hard to understand for the novice. Here is a few words you might encounter in the world of MIDI.

- **Channels** — A MIDI file contains 16 channels. Each channel contains information that make up the basic structure of a song. Each channel consists of notes for a single instrument.
- **Channel Mapping**—This is available on most sequence software on the market today. Since some sequencers can only send and receive on one channel, this lets you send that channel to any of the other available 15 channels. MIDI mapping ensures device independence since only designated channels are used.

- **Instrument Patch** — A specific sound that a synthesizer is capable of reproducing. The patch number and sound quality of an instrument varies from one synthesizer to another. The same instrument can sound different on different makes of synthesizers.
- **MIDI File** — A standard file format for storing recorded MIDI information. A MIDI file contains notes, timing and instrument designations for up to 16 channels and information about each note: key, duration, volume, channel number, and velocity (how quickly the key travels to its down position when struck).
- **Polyphony** — This refers to the maximum number of notes that can be sustained by a synthesizer at once. For example, a four-voice synthesizer with six-note polyphony can concurrently play six notes distributed among four different sounds. This could, for example, amount to a four note piano chord, a flute, and a violin.
- **Sequencer** — A computer program, such as Sequencer Plus, or an electronic instrument, such as a keyboard capable of storing a series of musical notes. These sequence of notes can be sent of a synthesizer to produce sound and music.
- **Synthesizer** — An electronic device modifies waveforms to create sound and music. The quality and range of this sound depends on several factors: the number of individual waveforms or voices that synthesizer chip can play simultaneously, the software and memory size.
- **Timbre** — The tone quality of a sound determined by the frequencies that make it up. It can also mean the unique sound associated with an instrument such as a violin or saxophone.
- **Voices** — The number of instrument sounds or timbres that can be played simultaneously in a synthesizer.

Variations in MIDI Files

A MIDI file is a standard format for storing recorded MIDI information. A MIDI file can contain up to 16 channels of music data. This structure is what makes it possible to record different instruments and play them back at the same time with each instrument on a different channel.

While MIDI may be a standard, the number values assigned to each instrument are not. Each manufacturer decides their own number. That is why some MIDI file sound different when played on a different MIDI device.

For our purpose here, we shall use the terms *General MIDI* to refer to MIDI files. Under Microsoft's Windows with Multimedia Extensions, to support devices with different capability, a MIDI file contains two sets of MIDI events. The first set is located on the first ten channels and is for *Extended MIDI*. The second set, the last four channels, is for *Basic MIDI*. Only one event can be played at a time and is device dependent. In Extended MIDI, devices must be able to playback at least 16 melodic and 16 percussion notes. A basic device must play six melodic and five percussion notes. (Refer to the Appendix for the MIDI capability of the Sound Blaster Pro's synthesizer chip).

MIDI files that are complex and have too many notes to be played at the same time, might be beyond the hardware capability of the MIDI device. However, the software driver attempts to provide the best possible output.

Variation in Drum Channel

Another issue is the location of the drum (percussion) channel. Normally, it is either on channel 10 or 16. This depends on how the MIDI file was created and the software device used. Since there is no standard or fool-proof way to identify whether a MIDI channel is a drum channel, most software programs assume the drum channel is at a predefined channel or request the users to specify the channel.

Variation in Instrument Table

The instrument table contains 128 different instruments. Different MIDI devices have different instruments in their instrument table. With such a variety of instruments, you can see why MIDI file created with one device can sound different when it is played on another device.

0 Acoustic Grand Piano	31 Guitar Harmonics	62 Synth Brass 1
1 Bright Acoustic Piano	32 Acoustic Bass	63 Synth Brass 2
2 Electric Grand Piano	33 Electric Bass Fingered	64 Soprano Sax
3 Honky-Tonk Piano	34 Electric Bass Picked	65 Alto Sax
4 Rhodes Piano	35 Fretless Bass	66 Tenor Sax
5 Chorused Piano	36 Slap Bass 1	67 Baritone Sax
6 Harpsichord	37 Slap Bass 2	68 Oboe
7 Clavinet	38 Synth Bass 1	69 English Horn
8 Celesta	39 Synth Bass 2	70 Bassoon
9 Glockenspiel	40 Violin	71 Clarinet
10 Music Box	41 Viola	72 Piccolo
11 Vibraphone	42 Cello	73 Flute
12 Marimba	43 Contrabass	74 Recorder
13 Xylophone	44 Tremolo Strings	75 Pan Flute
14 Tubular Bells	45 Pizzicato Strings	76 Bottle Blow
15 Dulcimer	46 Orchestral Harp	77 Shakuhachi
16 Hammond Organ	47 Timpani	78 Whistle
17 Percussive Organ	48 String Ensemble 1	79 Ocarina
18 Rock Organ	49 String Ensemble 2	80 Synth Lead 1 (Sq. Wave Lead)
19 Church Organ	50 Synth Strings 1	81 Synth Lead 2 - Sawtooth Wave
20 Reed Organ	51 Synth Strings 2	82 Synth Lead 3 - Caliope Lead
21 Accordion	52 Choir Aahs	83 Synth Lead 4 - Chiff Lead
22 Harmonica	53 Voice oohs	84 Synth Lead 5 - Charang
23 Tango Accordion	54 Synth Voice	85 Synth Lead 6 - Solo Synth Voice
24 Acoustic Nylon Guitar	55 Orchestra Hit	86 Synth Lead 7 - Bright Saw Wave
25 Acoustic Steel Guitar	56 Trumpet	87 Synth Lead 8 - Brass and Lead
26 Electric Jazz Guitar	57 Trombone	88 Synth Pad 1 - Fantasia Pad
27 Electric Clean Guitar	58 Tuba	89 Synth Pad 2 - Warm Pad
28 Electric Muted Guitar	59 Muted Trumpet	90 Synth Pad 3 - Poly Synth Pad
29 Overdriven Guitar	60 French Horn	91 Synth Pad 4 - Space Voice Pad
30 Distortion Guitar	61 Brass Section	

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92 Synth Pad 5 - Bowed Glass Pad	104 Sitar	116 Taiko Drum
93 Synth Pad 6 - Metal Pad	105 Banjo	117 Melodic Tom
94 Synth Pad 7 - Halo Pad	106 Shamisen	118 Synth Drum
95 Synth Pad 8 - Sweep Pad	107 Koto	119 Reverse Cymbal
96 Synth SFX 1 - Ice Rain	108 Kalimba	120 Guitar Fret Noise
97 Synth SFX 2 - Soundtrack	109 Bagpipe	121 Breath Noise
98 Synth SFX 3 - Crystal	110 Fiddle	122 Seashore
99 Synth SFX 4 - Atmosphere	111 Shanai	123 Bird Tweet
100 Synth SFX 5 - Brightness	112 Tinkle Bell	124 Telephone Ring
101 Synth SFX 6 - Goblin	113 Agogo	125 Helicopter
102 Synth SFX 7 - Echo Drops	114 Steel Drums	126 Applause
103 Synth SFX - 8 Star Theme	115 Woodblock	127 Gunshot

Playing MIDI Files

This program located in the **\SBPRO\PLAYMIDI** subdirectory. Before you can use the PlayMIDI program the driver must be loaded. The driver SBMIDI is located in the **SBPRO** directory.

➢ Entry Format:

PLAYMIDI ***<MIDIFILE>*** ***[/FMT:type]*** ***[/DRUM:channel]***

To play a MIDI file:

1. Change top the **SBPRO** directory.
2. Type **SBMIDI** and press **Enter** to load the driver.
3. Change to the **\SBPRO\PLAYMIDI** subdirectory and type **PLAYMIDI** ***<MIDIFILE>*** and press **Enter**.

Note: The SBMIDI drivers reads the environment setup of the Sound Blaster Pro's I/O port. If you have changed your hardware configuration, run **SET-ENV**. Refer to *Chapter 1, Installation.*

The following options are available with PlayMIDI:

- */FMT :type*— This sets the program to play either Basic or Extended MIDI formats. Default is General MIDI format in which all 16 channels are used for MIDI event.
- */DRUM:channel*—Defines the drum channel. Default is channel 10.

  Example: **PLAYMIDI STOMP /FMT:EXTENDED.**

Playing .CMF Files

For those of you who wish to play .CMF music, we have included the PLAYCMF program and some .CMF files in the **\SBPRO\PLAYCMF** subdirectory.

To play CMF files:

1. Change to the **SBPRO** direcory and type **SBFMDRV.** This loads the driver in memory.
2. Change to the **\SBPRO\PLAYCMF** subdirectory and type **PLAYCMF** *filename* and press **Enter.**

Example

To play the song AULD.CMF, type **PLAYCMF AULD** and press **Enter.** You can add the following options */Q* and */S.*

- */Q*—Sets quiet screen mode.
- */S*—Executes DOS command specified. You use this to play music in the bacground and to execute other DOS programs.

To unload SBFMDRV:

1. From the DOS prompt, type **SBFMDRV** */U* and press **Enter.**

Appendixes

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Appendix A

General Specifications

New FM music voices

- New FM OPL3 music chips using four operator voices provides enhanced sound.
- Frequency Modulation sound generation for realistic sounds
- Compatible with previous versions, the OPL3 has nine melody and five percussion sounds supported by numerous games and entertainment software. In addition, the OPL3 has 15 melodies using two operators plus five percussion sounds, or six melodies using four operators, three melodies using two operators plus five percussion sounds.
- Eight selectable waveforms.

Stereo Digitized voice channel (2 x 8 bit DAC)

- Provides output of sound sampled from the real world—speech, special effects, animal sounds, thunderstorm can be easily reproduced on these stereo DAC channels.

Programmable sampling rate

- 4KHz to 44.1 KHz - mono
- 11KHz and 22.05KHz - stereo

DAC Transfer modes:

- Direct mode - direct single byte transfer by CPU
- DMA mode - No CPU intervention/overhead required

Compression schemes:

- 8-bit data , no compression
- 2 to 1 compression: 4-bit ADPCM, hardware decompression
- 3 to 1 compression: 2.6-bit ADPCM, hardware decompression
- 4 to 1 compression: 2-bit ADPCM, hardware decompression

Built-in Digital/Analog Mixer

- Software programmable digital/analog mixer
- Mixing Inputs each with digital volume control (log scale)

  Stereo DAC - 8 levels

  FM Music - 8 levels with steering

  CD-Audio - 8 levels

  Line-In - 8 levels

  Microphone - 4 levels

  Master Vol - 8 levels

Built-in stereo power amplifier

- Four watts per channel, four ohms stereo output.
- Stereo headset connector, drives any speaker or headset.

Master Volume Control

- Built-in master manual volume control .

Eight-bit stereo A-D conversion of sound signal

- variable sampling rate : 4KHz to 44.1KHz.

ADC transfer modes:

- Direct mode
- DMA mode - no CPU intervention required

Built-in microphone jack and amplifier with AGC (Automatic Gain Control)

- Direct input (sampling) of sound/speech from the real world through standard microphone.

Sound input selectable by software from:

- Microphone input (mono)
- Line input (mono or stereo)
- CD audio input (mono or stereo)

CD-ROM Interface

- Built-in CD-ROM AT-Bus type interface and CD-ROM audio line-in connector.

Joystick Port

- Built-in standard game I/O port (15 pin D-sub connector). Connects any standard IBM compatible joystick (analog).

MIDI Interface

- Built-in MIDI interface, for connection to MIDI instruments or keyboards.
- Provides 64 bytes FIFO (first in first out) buffer to control high speed transfer.

Appendix B

I/o Address Selection

The Sound Blaster Pro uses 24 consecutive I/O addresses. There are two choices of I/O Base address.

Base Address	I/O Addresses used
220H	220H to 237H
240H	240H to 257H

I/O Address Map

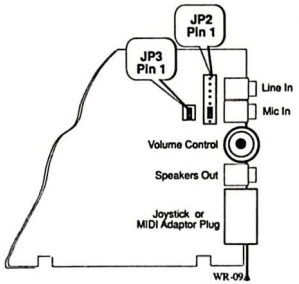
200H - 207H .... Game port ..... (read/write)
Base + 0H ..... FM music Status Port ..... (read)
Base + 0H ..... FM music Register Address Port ..... (write)
Base + 1H ..... FM music Data Port ..... (write)
Base + 2H ..... Advanced FM music Status Port ..... (read)
Base + 2H ..... Advanced FM music Register Address Port .. (write)
Base + 3H ..... Advanced FM music Data Port ..... (write)
Base + 4H ..... Mixer chip Register Address Port ..... (write)
Base + 5H ..... Mixer chip Data Port ..... (read/write)
Base + 6H ..... DSP Reset ..... (write)
Base + 8H ..... FM music Status Port ..... (read)
Base + 8H ..... FM music Register Address Port ..... (write)
Base + 9H ..... FM music Data Port ..... (read)
Base + 0AH ..... DSP Read Data ..... (read)
Base + 0CH ..... DSP Write Data or Command ..... (write)
Base + 0CH ..... DSP Write Buffer Status (Bit 7) ..... (read)
Base + 0EH ..... DSP Data Available Status (Bit 7) ..... (read)
Base + 10H ..... CD-ROM data register ..... (read/write)
Base + 11H ..... CD-ROM status register ..... (read)
Base + 12H ..... CD-ROM reset register ..... (write)
Base + 13H ..... CD-ROM enable register ..... (write)
388H ..... FM music Status Port ..... (read)
388H ..... FM music Register Address Port ..... (write)
389H ..... FM music Data Port ..... (write)
38AH - 39FH ..... (reserved)

Audio In Pin Assignment

PC Speaker connector		
PIN	**SIGNAL**	**I/O**
1	+5V	IN
2	SPK	IN

CD IN connector		
PIN	**SIGNAL**	**I/O**
1	GROUND	IN
2	CD LEFT CHANNEL	IN
3	GROUND	IN
4	CD RIGHT CHANNEL	IN

Connectors JP2 and JP3 Audio Extension Pin Assignments



Connector JP2	
Pin	**Description**
1	MICR - Mic input, right channel. Input range 0.004 to 0.7 V rms
2	MICGEN - Mic input ground.
3	MICL - Mic input left channel, input range 0.004 to 0.7 V rms.
4	SPKGND - Speaker output ground.
5	SPKR - Speaker output right channel. Maximum output voltage 3 V rms at 4 ohms.
6	SPKL - Speaker output left channel. Maximum output voltage 3 V rms at 4 ohms.
7	SPKRL - Speaker output return signal for left channel.
8	SPKRR - Speaker output return signal for right channel.

Connector JP3	
Pin	**Description**
1	SPKR - Speaker output Right Channel. Maximum output voltage 3 V rms at 4 ohms.
2	SPKRR - Speaker output return signal for right channel.

Appendix C

Quick Help Reference

Read this if you have problems installing Sound Blaster Pro. (Refer to: **Common Problems Encountered**)

When installing the Sound Blaster Pro Card, beware of possible hardware conflicts with other adaptor cards.

Each adaptor card may contend for various CPU resources, there are three possible sources of hardware conflicts :

- DMA channel conflict
- IRQ (Interrupt Request) lines conflict
- I/O address conflict

In the case of Sound Blaster Pro, it uses :

- DMA Channel 1 by default, for its digitized voice input/output DMA operations.
- Interrupt default at IRQ 7 (used for voice/MIDI operations) Jumper selectable at IRQ 2, IRQ 5, IRQ 7 and IRQ 10.
- I/O address : 220H - 237H as default. Jumper selectable at : 220H and 240H. FM music chip also uses addresses 388H and 389H. Joystick port uses the standard address of 200-207H.

DMA Conflicts

The DMA channel used by the Sound Blaster Pro is selectable from 0,1 and 3. It can share a DMA channel with other adaptor cards, provided that these cards can also share DMA channels.

Other cards using DMA channels can have their DMA channels selectable. We suggest that you change the other cards' DMA Channel to either Channel 0 or Channel 3, if a conflict occurs.

Interrupt Line (IRQ) Conflict

The Sound Blaster Pro uses interrupt line IRQ7 as default. Sometimes the printer interface (LPT1:) can snatch away IRQ7 although it doesn't require the interrupt.

In the rare case of interrupt conflict with another I/O card, you can change the interrupt of the Sound Blaster Pro to IRQ2 or IRQ5 (See Table 1 for the best IRQ line to use).

We don't suggest using IRQ10, because there are too many existing software packages that do not allow the selection of IRQ10.

I/O Address Conflict

The possibility of conflict on the default I/O address of 220H is very small. We advise against changing this I/O port address. Changing from this default I/O address means that you have to re-install many software programs that support Sound Blaster Pro.

Interrupt and DMA Assignments

If there is a conflict with another card in your system, we suggest you change the I/O port address of the other card. Remember to re-install the I/O port address for programs running on that card.

Interrupt table

Interrupt	AT Machines
IRQ 0	Used by system Timer
IRQ 1	Used by Keyboard
IRQ 2	FREE
IRQ 3	FREE (or COM Port 2)
IRQ 4	Use by COM Port 1
IRQ 5	FREE
IRQ 6	Used by Diskette Controller
IRQ 7	Default used by Sound Blaster Pro
IRQ 10	FREE

DMA Table

DMA Channels	AT Machines
DMA Channel 0	FREE
DMA Channel 1	Default
DMA Channel 2	Used by Diskette Controller
DMA Channel 3	FREE

Common Problems Encountered

PROBLEM TEST-SBP's Interrupt cannot be detected.

CAUSE Conflict on DMA Channel 1 with scanner card or network card, or other special cards that uses DMA channel 1.

REMEDY Remove scanner card or network card (if you have one) and re-install its DMA to Channel 3. You need an AT machine to resolve this conflict. (see DMA CONFLICT)

Other cards that could possibly use DMA Channel 1 are: diskette COPY cards, SCSI cards or any special card. Remove these special cards one by one and run TEST-SBP to see if the error message disappears. If the error disappears, then the card removed last is in conflict with Sound Blaster. Check the other card's manual for re-installing its DMA.

PROBLEM TEST-SBP's ERROR FOUND ON INTERRUPT

CAUSE Conflict on IRQ7, your system uses IRQ7.

REMEDY Remove Sound Blaster Pro from your system, and re-install its interrupt jumper (refer Changing Jumpers for more details) from IRQ7 to IRQ2 or IRQ5.

If you have used up IRQ2 and IRQ5 for some other card,

you can try to look at IRQ7 again. If it is also used up, try to look for the jumper on your system board or Parallel I/O card that allows you to disable IRQ7 for LPT1:. You can consult the respective manual or your computer vendor on how to do this.

PROBLEM Voice Recording too soft.

CAUSE Microphone used is not sensitive enough.

REMEDY Use a 600-ohm microphone with a sensitivity of -75 dB or better for good recordings.

As a rule of thumb, one that costs more than US$30 should do the job. Remember to buy a 1/4 inch to 1/8 inch adaptor-jack if the microphone has a 1/4 inch jack. A condenser microphone works will with the Sound Blaster card.

PROBLEM Background static noise from the speakers.

CAUSE Noisy power supply of the computer system.

REMEDY Computer systems are well-known to be the greatest producers of electrical noise. Much care had been taken in the design of Sound Blaster Pro's built-in amplifier to reduce as much noise from the computer's power supply as possible. There are, however, some computer systems that simply produce too much noise. These noise are picked up and amplified to audible range when the power amplifier is set at a high volume. There is no good remedy here, except to turn down the volume control. If louder volume is desired, try to amplify using an external amplifier.

PROBLEM "No interrupt vector available" error when running SBFMDRV.

CAUSE All the DOS software interrupt vectors (INT 80H - 0BFH) are taken up by a resident program that is misbehaving.

REMEDY Most commonly, the misbehaving resident program is a DOS MENU resident program in your

AUTOEXEC.BAT file. You can avoid problem with this kind of resident programs in the following ways:

- Boot the system again from a DOS diskette and then run SBFMDRV from the \SBPRO sub-directory to confirm that the problem is solved.
- During the booting process of the hard disk, press Ctrl-Break to abort the AUTOEXEC file. Then run:

  \SBPRO\SBFMDRV

- Execute \SBPRO\SBFMDRV before running the misbehaving program in your AUTOEXEC file. i.e. insert the line \SBPRO\SBFMDRV before the misbehaving program. This might only solve some cases with a partially misbehaved program. With a badly misbehaved resident program, you might have to remove it from the AUTOEXEC.

PROBLEM Joystick port not working.

CAUSE Sound Blaster Pro's Joystick port conflicts with existing joystick port in the system.

REMEDY Take out the Sound Blaster Pro Card and remove the JOYSTICK ENABLE jumper (JP4). Use the joystick port in your system instead.

Note: Removing JP4 will not remove the MIDI function of the card. The MIDI pins are still active on Sound Blaster Pro's joystick port.

PROBLEM Joystick not working properly in some programs.

REMEDY This is a classic problem with PC's joystick port which uses the CPU timing to calculate joystick position. When a CPU is too fast and the program does not take good care of the change in CPU speed, the wrong calculation would cause the joystick port to move to its unusable range.

The Sound Blaster Pro adheres to this PC standard and hence would inherit the same problems. You could

confirm that the joystick port is working if some programs can handle the joystick properly.

The possible remedy here is to switch the computer to its lowest possible speed.

PROBLEM Sound Blaster Pro's MIDI port not compatible to Roland MPU 401.

REMEDY The Sound Blaster Pro complies with the International MIDI Association recommended standard. The MPU 401 has some intelligence in its MIDI implementation. This intelligence could be easily emulated by a small driver routine in the PC. Hence, programs that run on the MPU 401 cannot work directly on the Sound Blaster Pro. They must be modified by their respective software companies in order to run on the Sound Blaster Pro.

Before buying any MIDI software, please ensure that they support Sound Blaster Pro.

PROBLEM Computer hangs after running one of the Sound Blaster Pro program.

CAUSE Conflict with other adaptor cards in the system.

REMEDY To identify the possible conflicting card, remove all the non-essential cards one by one from the system; leaving only the Floppy/Hard Disk Controller card and Video Adaptor card in the system.

After each card is removed, run the same program that hangs the system. If problem is solved, then the last card removed has a possible conflict with Sound Blaster Pro. Try to determine whether it is a DMA conflict, interrupt conflict or I/O address conflict by looking up the manuals of this card.

Appendix D

Connecting Internal PC Speaker

It is possible to connect the internal PC speaker to the Sound Blaster Pro. However, due to the variations of internal PC speaker connections found on different systems, you may need an experienced PC technician to complete this procedure or you may want to seek the help of your local computer dealer.

Procedures For PC Technicians Only

To connect internal PC speaker:

1. Locate the PC speaker connection on the motherboard.
2. Remove the connection to the internal PC speaker.
3. From the motherboard, connect a wire from the +5Vdc pin of the speaker connector to pin 1 of JP1 on the Sound Blaster Pro.
5. Connect another wire from the Data out pin of the motherboard speaker connector to pin 2 of JP1 on the Sound Blaster Pro.
6. You will need to provide your own suitable connecting wires and sockets.

Caution ***DO NOT ATTEMPT TO FIX THE CONNECTION YOURSELF IF YOU ARE NOT SURE OR ELSE YOU MIGHT DAMAGE YOUR PC OR THE SOUND BLASTER PRO. CREATIVE LABS, INC. OR THEIR DISTRIBUTORS WILL NOT BE LIABLE FOR SUCH DAMAGES.***

Appendix E

Connecting CD-ROM Drive

The Sound Blaster Pro has a built-in CD-ROM Drive interface which can be connected to a Matsushita model CR-521 CD-ROM Drive. Detailed connecting instructions and cable kits are provided when you purchase the CD-ROM Drive from Creative Labs or one of their dealer.

SOUND BLASTER PRO

Stereo/Music/Voice/MIDI/CD-ROM Interface/Game Port

The Multimedia Sound Card For Your PC

THE MULTIMEDIA SOUND STANDARD

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